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PROSPECTS OF NEW PRODUCTION OF GAS MAKING OILS[1]

BY P. W. PRUTZMAN.

In these days, when practically all city gas is made from petroleum, a knowledge of the available supplies of this material, and of the prospects for future production and for fluctuation in price, are of considerable importance to the gas-maker. This will be my apology for a paper which must, from its very nature, be hard reading.

Petroleum has long been known to exist in California, and has been produced in commercial quantities for more than thirty years. But for a long time so small was the production that, so late as 1899, Peruvian oil or distillate was still being imported for gas-making purposes, and the price of local products made them a luxury.

During the twelve years past, the search for new deposits has been carried on actively in almost all parts of the State, with the result that California has been carried from the seventh or eighth position to that of by far the largest producer, and our oil fields now yield more petroleum annually than any similar area in the world. The output for the current year bids fair to reach a total not far from eighty millions of barrels, as against perhaps fifty millions for the combined Russian fields, and about thirty millions for the Kansas-Oklahoma field, our nearest competitor in the United States. Yet strangely enough, this enormous production is taken almost entirely from seven small areas, the total surface covered being considerably less than that of San Mateo, one of our smallest counties.

The following tables show the production for 1909 by counties, and by fields. In this table, 20 degrees Beaume is taken as the lowest limit for refining oils, and the estimated output of oils over and under this figure stated for each field. Table 3 shows the production for the month of July, 1910, by fields.

Oil Pumping Rigs in Coalinga Field

TABLE 1.

PRODUCTION OF PETROLEUM, BY COUNTIES.

FOR THE YEAR 1909.

County.	Fields.	Barrels.
Fresno	Coalinga	15.406,619
Kern	Kern River, Sunset, Midway and McKittrick	24,549,758
Los Angeles	City, Sherman and Whittier	5,409,392
Orange	Fullerton	4.270,967
San Luis Obispo	Edna	30,000
Santa Barbara	Santa Maria and Summerland	8,116,788
Santa Clara	Moody Gulch and Sargents	63,780
Ventura	Ventura	344.419
		58,191,324

Figures by California State Mining Bureau.

[1]Paper read at eighteenth annual convention Pacific Coast Gas Association, September, 1910.

TABLE 2.
PRODUCTION OF PETROLEUM, BY FIELDS.
FOR THE YEAR 1909.

Field.	County.	Heavy Oil, barrels	Light Oil, barrels.
Coalinga	Fresno	11,554,964 14 to 20°	3,851,655 20 to 30° Be
Kern River	Kern	14,508,242 13 to 17°	
Sunset	"	1,999,701 11 to 20°	
Midway[1]	"	1.787,564 13 to 20°	446,891 20 to 28°
McKittrick	"	5,807,360 14 to 19°	
L. Ang'les	L. Ang'les	529,765 14 to 16°	
Sherman	"	3,439,020 15 to 20°	382,113
Whittier	"	211,946 14 to 20°	635,839 20 to 30°
Newhall	"	57,403 14 to 20°	114,806 20 to 36°
Puente	"		38,500 20 to 33°
Fullerton	Orange	2,462,581 17 to 20°	1,708,386 20 to 35°
Edna	San Luis	30,000 11 to 12°	
S. Maria[2]	S.Barbara	3,232,180 14 to 20°	4,848,270 20 to 27°
Summerland	"	66,338 14 to 16°	
M'dy Gulch	S. Clara		1,800 38 to 42°
Sargents	"	61,980 15 to 19°	
Ventura	Ventura	86,105 13 to 20°	258,314 20 to 40°
Totals[3]		45,815,149	12,286,547

Production figures by California State Mining Bureau. The gravity estimates are my own.

[1] As you will note from Table 2, the production of the Midway field has greatly increased since the end of 1909. This will make a great change in the above figures for this year, as a considerable part of the new production is very close to 20 degrees, running from 9.5 to 23 degrees. There is but one well of the latter grade, and how much of this sort of production is in sight cannot be told. The bulk of the gusher production runs from 20 to 23 degrees, and if the present proportions are maintained, perhaps half the output of this field for the current year will fall within the latter limits.

[2] The figures from Santa Maria last year were largely for oil from the Old Field and Lompoc. This year Cat Canyon is bringing in a good deal of 14 degree oil, and therefore any increase from this field over last year's figures will go in the heavy oil column.

[3] These figures were partly taken from different sources, and the slight discrepancy from Table 1 has not been corrected. It should be understood that the divisions given are only estimates, while the figures for output are based on direct returns.

TABLE 3.
PRODUCTION OF PETROLEUM, BY FIELDS.
FOR MONTH JULY, 1910.

Coalinga	1,688,959
Kern River	1,118,278
Maricopa (Sunset) (includes Lakeview)	1,095,000
Midway	924,000
McKittrick	474,779
Los Angeles City	38,080
Sherman	285,738
Whittier	89,925
Newhall	12,145
Puente & Fullerton	417,894
Arroyo Grande (Edna)	1,000
Santa Maria, Lompoc and Cat Canyon	713,200
Summerland	5,305
Sargents (Watsonville)	1,500
Ventura	36,162
Total for month	6,901,965

The totals for three months were:

May	7,172,313
June	6,696,789
July	6,901,965
Total three months	20,761,067

Figures by California Oil World.

Considering the great extent of the territory over which search for oil has been prosecuted, and on which there are more or less indications of future production, it may be well to resume very briefly the records of these operations.

Humboldt County.

The most northern developments in California are in Humboldt county, where the search for oil commenced in the early sixties, and still continues at intervals. In the valleys of Bear river and Mattole river, many seepages of gas and light petroleum are found, and a number of the wells drilled in these valleys have found oil in small, but never in profitable quantity. This is a very light oil, and would be valuable for refining and other purposes, but in spite of the wide area over which seepages occur, it is doubtful whether any large production is in sight here. The formation is of shale and hard sandstone, the oil occurring in the latter, and both the hardness of the oil rock and the highly broken and faulted condition of the formation point toward small production per well. While there are some prospects for production, I do not believe that anything may be expected from this territory which will effect the market in the near future.

Shasta County.

To the east, in Shasta county, several wells have been drilled, but so far without finding either oil or any definite encouragement.

Mendocino County.

Coming further south, several wells were drilled in the neighborhood of Ukiah, but without any discoverable result. West of this point, on the ocean near Point Arena, a large deposit of bituminous rock is found, and a number of wells have been sunk, finding only traces of a heavy, tar-like oil similar to the heaviest oils of the valley.

Colusa County.

East of Ukiah, on the boundary line between Colusa and Sonoma counties are several seepages of a most peculiar and remarkable oil (a dark green oil of 15 degrees gravity but quite free from asphalt) but to the present no quantity of this oil has been discovered in the holes drilled. As these seepages lie far back in the hills, in rocks of considerable age and much disturbed, it is probable that they do not indicate the location of any considerable deposits, and that if such exist they will be found in later formations, lying to the eastward.

Sonoma and Solano Counties.

Going south again, prospecting has been done near Petaluma, and in the neighborhood of Fairfield. Gas has been found in some quantity at both points, and oil has been reported from the former. There is considerable territory here which has been but little investigated, and while I believe that several portions have fair prospects of ultimately being brought to production, this requires so much time that there is nothing here to hold our immediate attention.

Marin County.

On the ocean at Bolinas Bay, two wells were drilled some years ago, getting a small amount of a medium grade black oil (gravity 21.5 degrees). No work has been done at this point for some time, and little is known of the history of this venture.

Contra Costa County.

On the eastern shore of San Francisco Bay and the west slope of Mt. Diablo, prospecting has been carried on for several years, and two grades of oil have been found, a brownish oil of about 19 degrees gravity, and a greenish oil of some 30 degrees gravity. The formation here is much broken, and while oil has been found over a wide range, no quantity has been found at any one point. In my opinion the prospects, if any, are farther to the eastward.

San Joaquin County.

In the general neighborhood of the above, and not far from Tracy, a single deep well is now drilling, on

FIGURE 1
SKETCH MAP OF
CALIFORNIA
SHOWING LOCATIONS OF
PRODUCING PROSPECTED OIL-FIELDS
DATA FURNISHED BY
CALIFORNIA STATE MINING BUREAU
LEWIS E. AUBURY
STATE MINERALOGIST
DISTRICTS PROSPECTED WITHOUT RESULT
DISTRICTS NOW BEING PROSPECTED
PRODUCING DISTRICTS

the foothills of the Coast Range, and in the same position relative to the hills as the East Side wells at Coalinga. This well is said to have found considerable oil, and has just been cemented. Definite results are not yet known. If the report should prove to be true, this territory would be one to reckon with in figuring future production, as the rocks are here regular for long distances, and a strike at any one point puts in the possible class quite a strip of territory.

Alameda County.

On the Bay side of the same range, in the Livermore Valley, a number of wells have been drilled, most of them dry, but two or three showing a small quantity of oil, ranging from a thin brownish to a thin, dull green oil. It is probable that these all belong in the refining class, commercially considered. Several wells drilled in Corral Hollow gave no indications of oil. It is yet too soon to say what the prospects for the Livermore country may be, but it is perfectly safe to say that it will not in the near future produce anything to alter market conditions.

San Mateo County.

On the ocean face of San Francisco peninsula, oil has been found in Purissima creek and in Tunitas canyon, San Mateo county. Seepages here cover a considerable area, and a number of wells have pro-

duced some oil, from a fraction of a barrel up to two or three barrels per day. No profitable production was had, and it seems doubtful, considering the amount of work which has been done, whether there are any prospects for the future. These oils range from 21 degrees to 50 degrees in gravity, and are mostly quite light, brownish green oils.

Santa Clara County.

In the Santa Clara Valley, near the town of Los Gatos, a little 15 degree gravity oil was found in wells drilled some years ago. Active prospecting is now under way, but is not yet far enough advanced to warrant any opinion as to the results.

A few miles farther south, the old producing pool in Moody Gulch seems to be about pumped out, and while a small amount of oil is still being raised, new work done in an effort to extend the field or find a deeper sand has been unsuccessful. This is a thin green-brown oil of about 40 degrees gravity.

At the point where the boundaries of Santa Cruz, Santa Clara and San Benito counties join, a small district has been developed back of Sargents Station, on the Santa Clara side. One company has several wells producing a black oil ranging from 16 to 19 degrees, but neither this company nor others who have drilled here have succeeded in extending production over more than a few acres.

In the neighborhood of Santa Cruz considerable work was done some years since, but without any results whatever, and this district seems to be thoroughly condemned.

San Benito County.

Three wells have been drilled near the town of Hollister, without any result.

In Panoche and Vallecitos Valleys, an elevated table-land lying on the eastern margin of San Benito county, and separated by a single mountain range from the San Joaquin Valley, oil has been obtained in moderate quantity in a number of wells, while others have been dry. Strong hopes were once entertained of bringing much of this territory into production, but to the present no commercial oil has been found. While this territory is more or less broken, and there are small chances of developing any extended fields, I am of the opinion that there is, on the whole, a good deal of oil here which will be drawn on in future. Much of the land in this vicinity is held by one company, which is not now increasing its production. The oils found here vary considerably, but in general resemble the lighter oils of the valley, ranging from 20 to 26 degrees in gravity.

At the southern end of San Benito county, at the junction with Monterey, oil has long been known to exist in the Bitterwater valley. On one side of the fault which extends through this country a light green oil of 42 degrees gravity is found, but not in commercial quantity. On the other side a couple of wells have found traces of a heavy black oil, but though a number of wells, some of them quite deep, have been put down here and in the adjacent Topo country, no production has been had, and the prospects do not appear to be brilliant.

Monterey and San Luis Counties.

Where these counties join, a large deposit of bituminous seepage material is found in the San Antonio valley, west of Bradley. Here, and to the north and south, many wells have been drilled, but with no other result than to find a little heavy tar near the surface. Some work is now under way, and in spite of repeated failures I am of the opinion that oil measures do exist in this neighborhood, though not, perhaps, just where search has been made. There are no prospects here of immediate interest.

San Luis Obispo County.

In the northeast corner of this county, and just across the divide from Coalinga and Kreyenhagen, considerable work has been done in Cholame and Parkfield valleys, but without finding any profitable quantities. What the prospects may be here, I do not know.

In the southern part of the county, south of the town of San Luis, are extensive tar seepages, and prospecting has been done along a strip extending from Port Harford to Arroyo Grande, and up the Huasna. At Edna a little pool of very heavy oil (about 11 degrees gravity) has been opened, but efforts to extend this pool have not met with success, and all the other wells along this strip have been entire failures. There do not, at present, appear to be any very brilliant prospects for any of this territory.

East of this district, some prospecting has been done on the Carissa Plain, on the southeastern margin of the county. Oil has been reported from two or three of these wells, but I have not been able to verify the reports. Not being personally familiar with this territory I have no ground for an opinion, other than that prospecting seems to be abandoned at this time.

Santa Barbara County.

Passing the Santa Maria field, which is a heavy producer and will be spoken of more in detail, the next area prospected for oil is the south coast of this county. Starting at Gaviota, a number of wells have been drilled close to the coast, and some in the hills adjacent, all the way to the mouth of Rincon creek, the boundary line of Ventura county. Production was had at Summerland, but these little wells have just about gone out, and all the other test holes, including three or four quite deep ones, were dry. This is rather remarkable, as the coast abounds in oil seeps, but whatever the reason, this region seems to be thoroughly condemned by the drill.

Southern California.

Passing again the Ventura-Newhall field, and the Los Angeles-Fullerton group, we find that a good deal of work has been done adjacent to the latter, and covering in a scattering way the most of Southern California west of the San Jacinto Range. Wells have been drilled in the Simi valley (these gave some oil at one time, but do not now produce), on the south slope of the Santa Monica Range (dry), in the Repetto Hills east of Los Angeles (dry), on the northeastern extension of the Fullerton field in San Bernardino county

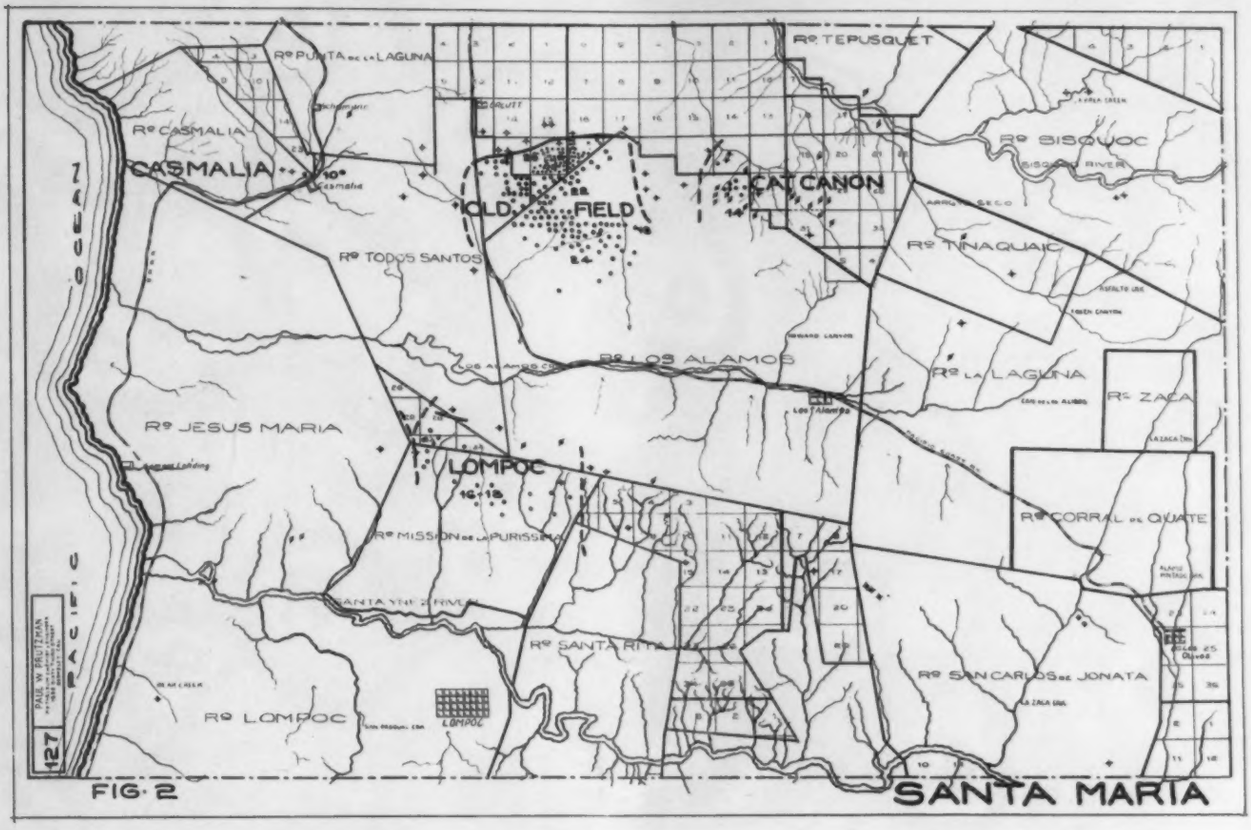


FIG. 2

(very small production), at Newport (small amounts of very heavy oil) and at San Pedro (traces only). None of this work offers much encouragement, but a little new work is now under way at several points.

In San Diego county, along the coast from Del Mar to the Mexican line, a number of prospect holes were drilled several years ago, but only one to any depth. This one showed traces of oil, and some work is now going on, but the country is still to be demonstrated.

San Joaquin Valley.

In the valley we find the producing fields, with the exception of Kern river, all on the eastern face of the Mount Diablo Range, and all located where the foothills meet the plain. These fields were, without exception, originally located by means of seepages. North of Coalinga we find but very few seepages, and these only a short distance north. The long stretch between Coalinga and the well near Tracy is practically untested by the drill, and while these foothills will, in all probability, furnish some of the future oil fields, any developments here are in the future, and need not be taken into present consideration.

Between Coalinga and McKittrick is a stretch of nearly forty miles, almost all parts of which show some indications of the presence of oil. Many wells have been drilled along this strip, and a few of them have obtained oil in small quantity. North of McKittrick, in the Temblor, a very small producing spot has been developed, but this cuts small figure in a production forecast. While it is difficult to speak in general terms of so long and diversified a piece of ground, all indications both of the drill and of geology point to a very serious doubt whether any large production will ever be had in this part of the hills. The oils of this strip range from 16 to 30 degrees in gravity, and from black to a light green in color.

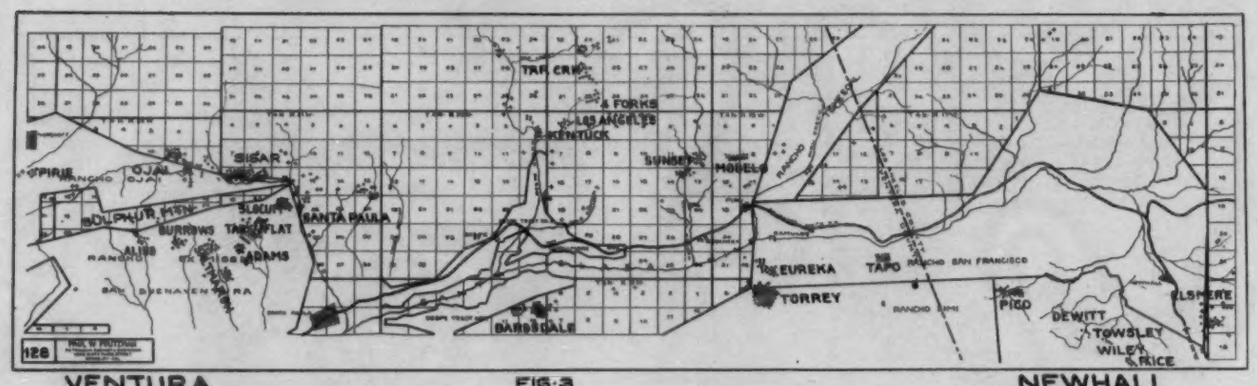
TABLE 4.

SUMMARY OF RESULTS FROM PROSPECTING.

Field.	Oil Found.	Prospects.
Humboldt	Considerable—V. l'gt gr, 48'	For small output.
Shasta	None	None demonstrated.
Mendocino Co.	Traces—V. heavy	None demonstrated.
Colusa Co	Considerable—H'y gr'n, 15'	Uncertain.
Sonoma Co	Doubtful	Not demonstrated.
Solano Co	None	Not demonstrated.
Marin Co	A little—Medium br'n, 21'	Unknown.
Contra Costa	Small amounts—Light	Poor.
San Joaquin	Not yet known	Not yet known.
Alameda	Small amounts	Uncertain.
San Mateo	Considerable—Light	Dubious.
Los Gatos	A little—Heavy black, 15'	Not yet proven.
Moody Gulch	Much—V. light green, 40'	Worked out apparently.
Sargents	Producing—Heavy black	No extension in sight.
Santa Cruz	None	None.
Hollister	None	None.
Vallecitos	Considerable—Med'm bl'k	Various, some good.
Bitterwater	Seepages—V. light gr'n, 42'	Very poor.
Topo	Traces—Heavy black	Very poor.
Bradley	Traces—V. heavy bl'k, 10'	Not yet proven.
Parkfield	Traces	Unknown.
Huasna	Traces—Heavy black	Dubious.
Carissa	Doubtful	No work at present, unknown.

General Conclusions.

It may be seen from the above that whatever prospects we have for increased production, in the near future at least, lie in extension and development of the already producing fields. Several extensive areas of prospected territory may be classed as possible but untested. Two or three are hopeful, but have been so little developed that large production is far in the future. The balance have been condemned, or are so limited by their physical and geological characteristics that they never could produce heavily. (Table 4 sum-



FIG·3

marizes the above). Now let us see what may be expected from the fields already developed.

Field Maps.

In examining the various maps attached, a series of heavy lines, solid and dotted, will be noted, surrounding certain groups of wells. Where solid, such a line is meant to indicate a limit to extension in this direction, shown with some certainty by the results of drilling. When dotted, it represents a probable limit, not definitely known, and based on the writer's opinion. Where the lines do not close, no data exists setting a limit on the open side.

It should not be understood that no oil may be found outside such limits, but only that no extension of present groups is likely in such directions. New producing areas may be found outside, but not connected with present developments.

Abandoned wells are indicated by a dot with four arms, forming a star. Drilling wells by a dot with sloping cross bar. Producing wells by a plain dot. Most of the producing wells are shown, in approximately correct position, a fair proportion of the drilling wells outside of proven limits, but abandoned wells are shown only where, in the writer's opinion, they have a bearing on establishing limits.

Santa Maria (See Map No. 2).

The Santa Maria field really comprises four subdistricts, three developed or partly developed, the fourth indicated only by a single well.

Near Casmalia Station, on the Southern Pacific, the Kern Trading & Oil Company have a well which appears to be capable of producing considerable very heavy oil (about 10½ degrees). To the north and west are several abandoned holes, two or more quite deep, and considering the extreme weight of the oil, it is hardly likely that this territory will have much effect on future market.

The Old Field or West Side was the original scene of activity in this region, and has been thoroughly marked out and largely developed. The oil from this group of wells runs from 18 to 28 degrees and averages about 24 degrees gravity.

At the north this field is limited by several failures, one of them a full 4000 feet deep, and dry. To the west there is but a slight possibility of extension—wells here are very deep, approximating 4000 feet, and while several of these had some oil, none were ever free enough from water to give a test of the territory. It appears a little doubtful whether, in the present state of the art, productive wells can be drilled here.

To the south drilling is still going on, and no limit can be set—it is even possible that the field is continuous with the Lompoc group, though personally I incline to doubt this.

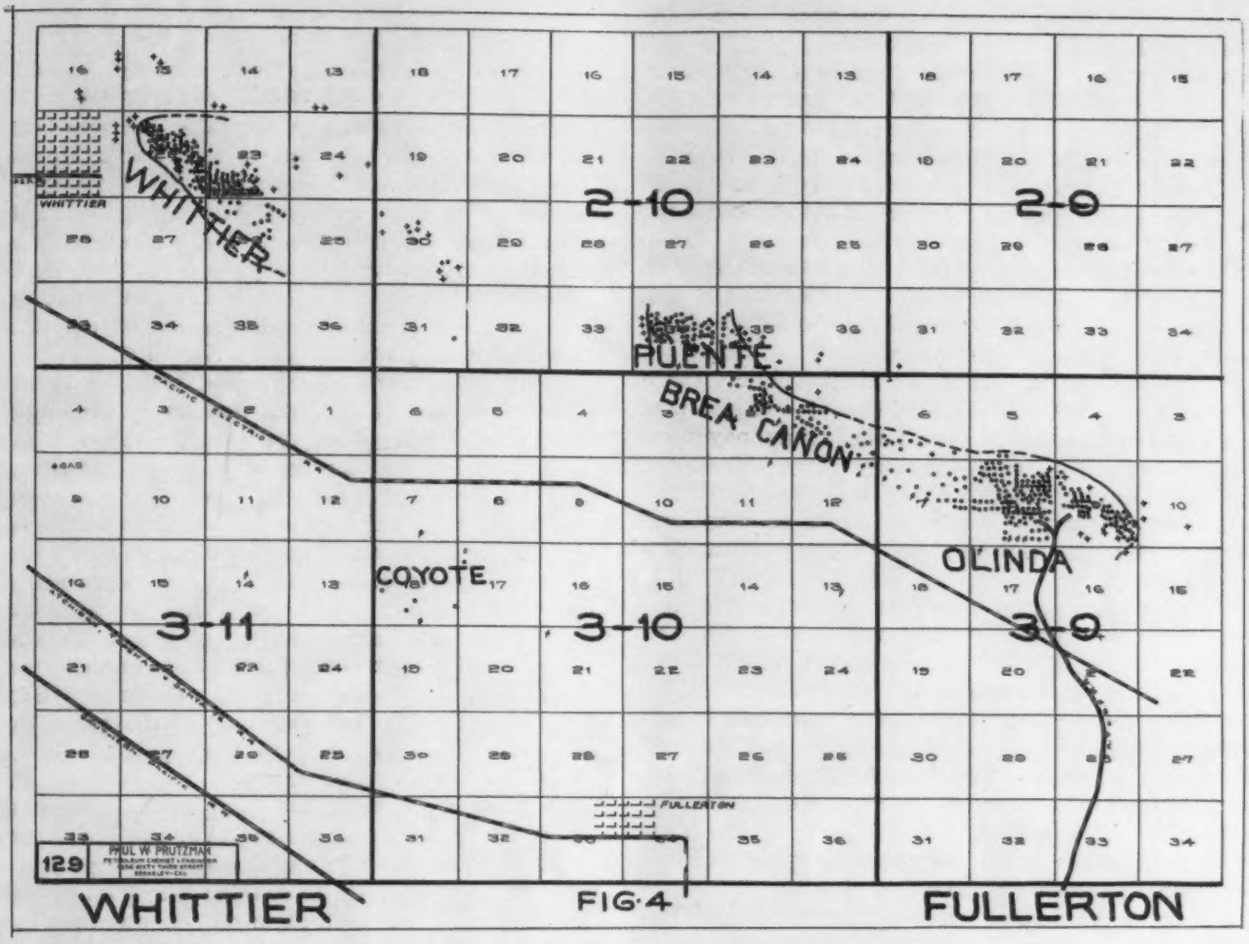
The Old Field some years ago suffered a great setback due to the intrusion of water into the sands on the south side. This trouble has to a large extent been remedied and the production recovered. On the northern side of this group the wells are free from water, and production has been remarkably steady and continuous. I would estimate that the production from this group would remain at about the present figure for some time to come.

The Lompoc or Purissima group of wells is anomalous in that the larger part of the wells and of the territory surrounding them are the property of a single company. For this reason accurate information is hard to obtain. We know that, to the west and the north, bounds have been set by two very deep holes, both entirely dry. To the northeast a producer has lately been brought in, and no definite bound has been set in this direction, nor to the south, though I believe that the furthest wells south do not greatly encouarge drilling in this direction. To the east extensions are blocked by several deep holes, showing some oil but not a workable quantity—one of these holes is more than 4600 feet deep, and therefore the next to the deepest in the State.

Even figuring that there is little prospect for any material extension in area here, the country already blocked out and proven by scattering wells is so large that there are undoubted capabilities for a considerable production, whenever the owners of the property think best to develop it. As it is in the hands of a corporation who are vitally interested in maintaining prices, I do not believe that we have any reason to expect this oil to be brought onto the market until the latter is ready to absorb it, which puts it into the indefinite future.

The oil from these wells runs from 16 to 18 degrees in gravity.

In Cat Canyon we have a peculiar state of affairs, and one hard to reckon with. Drilling is quite difficult, and many wells have been a long time under way. When finished they show considerable differences in behavior. Two of these wells are very heavy pro-



FIG·4

ducers, and as the sands appear to be rather uniform, it would seem that contiguous wells should also produce heavily, but most of them do not. Whether this is due to tar choking back the oil, or to other causes, I do not know, but the fact makes the field difficult to figure on. So far the field has not been limited by failures, except to the west, and there is even a possibility that the gap here, between the east and west fields, may be bridged. In any case, work now done shows up a considerable area capable of producing and which should be making a great deal of oil, though as a matter of fact a large part of its output comes from the two flowing wells mentioned. What the actual future of this field may be I cannot say, but I feel sure that it will bear watching by anyone interested in the oil market.

The oil from this group of wells is of one quality, and that quite heavy, about 14 degrees gravity.

Farther to the south, some drilling has been done in Foxen Canyon, and in the valley of the Santa Ynez river. None of this work has given encouraging results so far. This will presumably be heavy oil if any production is had.

Ventura and Newhall (See Map No. 3).

The strip of oil producing territory running the length of the Santa Clara river, in Ventura and Los Angeles counties, consists of a number of small separated pools, about twenty-seven in number. All of these patches of producing territory have been known and worked for a long time, and most of them have been more or less defined. Some new development work is under way on Sulphur Mountain and in the Ojaa, Simi and Tapo, and some success has been met in attempts to extend the Santa Paula, Tar Creek, Four Forks and Sunset groups. The production of each of these groups is so small, and the available territory so limited, that it would be tedious to consider each group separately.

Taken as a whole, this district does not give any indications of a large increase in output in the near future. During the last two years, with a high price for oil, the present wells have probably been worked to about their capacity. Without question there is considerable territory here which will be developed in future, but as said, it lies in small patches, and prospecting is slow and uncertain. I would estimate that this district would hold its own for a long time, the production of most of the wells, while small, being very steady, but will probably not show much if any increase.

Perhaps three-quarters of the oil from this district falls in the light or refining class, and it seems likely that this proportion will continue. Gravities range from 12 to nearly 40 degrees, and are mostly between 24 and 30 degrees.

Whittier and Fullerton (See Map No. 4).

The Whittier district proper appears to consist of one producing sand, and as this dips sharply, the

producing territory is of no great area. Wells are quite productive, however, and a small amount of new work is sufficient to maintain the production level.

This district appears to be limited at its west and northwest edges. There are some prospects for extension to the north, and perhaps, in spite of repeated failures, to the east. Nor can any definite line be set to the south, though it must be said that, unless the formation changes its angle in this direction, extension cannot proceed very far. It is altogether probable that the production of the Whittier field proper will not be greatly increased, though it is not likely to fall away for some time to come.

In Coyote Hills and in La Habra Valley, south and southeast of the main field, two productive spots not apparently connected with the main body have been discovered within the last five years. These are both deep drilling, and while no limits have been set, and there is likely to be considerable good ground here, development will be slow. These districts produce light oil.

The Puente group appears to be capable of extension to the north at least, and probably to the south. The production of this group, which is all light oil, does not come onto the market.

Some success appears to have been met in extending the Fullerton and Brea Canyon fields to the south, and no limits can be set in this direction. Both of these groups appear to be limited to the north, and Fullerton to the east, and incapable of extension in these directions. The oil from the eastern end of Fullerton is quite light, about 30 degrees, that from the body of the field is from 17 to a little above 20 degrees and that of Bear Canyon slightly heavier still. The oil from the new wells to the south is notably lighter, averaging well above 20 degrees.

It should be remarked of all this southern territory that, as there is an ample local demand for the entire production, none of this oil crosses the Tehachapis, and therefore does not at present cut any figure in the general market. A considerable increase in the production from the southern fields might operate to displace a certain amount of Valley or Coast oil, but this does not appear to me at all imminent.

Los Angeles and Sherman.

Both of these fields are sure to show a slow but steady decrease in production. Within the city limits of Los Angeles drilling is forbidden by ordinance, and the fields have not been extended beyond these limits except to the southwest. The Sherman field is in much the same condition—the drilling time allowed by the best of the leases has expired, and but little drilling can be done within the proven limits.

A good deal of work has been done to the east of Los Angeles city, and some is now under way. There is of course the possibility that some entirely new territory may be brought in at any time, but at present there is nothing to indicate it. No map of this territory is given, as the wells in the Sherman field belong largely to two companies, and the production of the city is too small to warrant. City oil runs about 14 degrees gravity, and that of the Sherman field ranges from this figure to slightly above 20 degrees.

(To be continued.)

"OLLA PODRIDA."

BY THE CHEERFUL IDIOT.

"Olla Podrida" is figuratively applied to literary productions of very miscellaneous contents."—Encyclopedia

An intimate friend of mine asked me some time ago, whether I was ever serious in my life. He was prompted to ask the question under the following circumstances: I had recently joined a lodge of which he was a prominent member. He wanted to know what I thought of it generally—but more especially the initiation ceremony. Oh said I, its very fine and impressive, but somewhat reminds me of the story of the Ameriacn gentleman and a Scotch friend of his. The Scot being very patriotic and full of love and pride for the land of his birth, used every evening to dress in full Highland regalia, take his bagpipes and march up and down his room playing good old Scotch airs. His American friend who by the way had a very fine looking daughter, invited him to dinner and asked him to bring his pipes. The invitation was gratefully accepted. Dinner being over, everyone adjourned to the drawing room. Sandy was asked to play something for them. He said he would willingly do so, if they would permit him to retire into another room for a short time. His request was granted, and soon after the squealling and groaning of the pipes was heard, and in comes Sandy in full regalia. He was greatly admired by the daughter who seemed unable to take her eyes off his manly form. When he had finished playing and had marched out, the American said to himself, The music may be alright but I don't see why the devil he couldn't play just as well with his pants on as with them off. It was then that my friend threw up his hands in pious horror and said "Good Lord man! were you ever serious in your life?"

Now the easiest way to obtain the bagpipe effect without a Scotchman is to procure a good healthy pig—jam it carefully under a gate so that it cannot go either way, and then stand on it; with a little practice one can produce sthathspeys, reels, pibrochs, or most anything. I am not quite sure about "pibroch." I mean I don't exactly know whether a pibroch is a part of the bagpipe or whether it is a part of the noise a bagpipe makes, but then one can't be expected to know everything. Some years ago a dynamo exploded in Station B, of what was then the Cal. Electric Light Co.'s plant. An enterprising newspaper reporter in describing the accident said "that volts weighing several hundred pounds were thrown across the street right into the gas Co.'s yard." Talking of explosion How little we realize how much we have to be thankful for. I once went through a terrific powder explosion, 3 or 4 were killed and I don't know how many hurt, while I wasn't even stunned. A Dr. who insisted on examining me whether I needed it or not, gave it as his opinion that I had nothing to stun. Many people stand in awe watching a certain steeple jack in this city working at the extreme top of a flagpole several hundred feet from the ground. He is the most wonderful man when aloft I have ever seen as well as the most reckless, at least he appears to be, to the casual observer. This is not really the case. It is an utter impossibility for him to get dizzy, he has

nothing to get dizzy with. Therefore unless something breaks he cannot fall.

And now the elections are over for a while, and we are able to pursue the even tenor of our way in peace. I never was much of a politician, but at the last election I must admit that I got into the political trough with all four feet. So much so that after having shouted my head nearly off for the wrong man, I wound up by going to the polling booth without my glasses and stamping the wrong column on the ballot. This universal suffrage business ought to be done something with.

What really caused me to break out so badly was the desire to do something in my small way to help elect men to the next Legislature who would consider favorably the proposed Engineers License law. I think however that it is most fortunate for myself that the campaign did not last any longer for I verily believe I should have finally gone to jail. I attended a meeting one evening on which occasion the subject of the License Law was brought before the house. Now this had the most astonishing effect of anything I ever saw in my life. Bless my soul! Donnybrook fair is a Sunday school treat in comparison. I was so glad to get away alive. Now why this extraordinary opposition to something which may do some good and which cannot so far as I can see do any possible harm to any one? I can understand people not appearing to care about the matter one way or another and the reason is simple. There has not been a boiler explosion in S. F. since somewhere back in the early eighties. Why? Well for two or three reasons. Good material in construction, and better material handling the machines. I think I am perfectly safe in saying that there is hardly a class among all professional men who study more to improve themselves and keep thoroughly up to date than do the engineers. How few people stop to think that at almost every step as they walk our streets they are directly over a mine, a mine of such tremendous power, that should a careless engineer happen to pull the wrong string, well there's no doubt some effect would be produced, which might start some people thinking. Sometimes it takes quite a shock to wake a person up. Doctors are licensed and are thereby protected from outside interference. I know one who is now perhaps 48 or 49 years of age, he is sweating up like a school boy to get a Cal. license and he has been practizing in a neighboring state for years. Doctors are protected yet they do more damage to human life in a week than an engineer does in a life time. The doctor's license permits him to make mistakes, which the undertaker buries. The whole proceeding usually being unaccompanied by much noise, except where the unfortunate mistake draws enough water to rate a brass band. The number of mistakes—fatal one, which a Dr. can make are limited only as to the size of his practice. Let however an engineer make one false move and his tribute towards the addition to the population in the other world would be limited only by the number of people who were not in the neighborhood when the false move was made. Yet notwithstanding all this, anyone can come into California and be an engineer because he says he is one. I don't think it's a fair deal.

I was discussing this matter with a very dear friend of mine the other day and when I get interested I get completely carried away. Now my friend has a pair of most umbrageous feet. More so in fact than those of the average policeman. I wondered for a long time why he always had a cold, but there is nearly a third of him on the ground which I think must have something to do with it. As I said, we were discussing this License law question very thoroughly, and in my excitement I commenced to walk about, subsequently walking mostly on my friend's feet. This circumstance is the cause of my forgetting exactly what conclusion we both came to. Says he "Get off my feet." Says I, "I must step somewhere," and he got insulted. The engineers as a class, and I think the majority of them throughout the state are in favor of a license. There are some sore heads among them who because they are unable to have things all their own way go about knocking the movement. And accusing the members of the engineers committees who have the matter in hand, of graft, trying to further their own political ends, and so forth. I believe this is wrong, in fact I know it is wrong. I am personally acquainted with every man on the committee. They are, as a collection, as fine a crowd of gentlemen as ever got together, as individuals they each have the qualifications which make good engineers and good citizens. Politics! Yes, of course they must do politics. The measure must be brought before the politicians, it needs their support. Members of the committee must therefor meet the politicians and ask for their support. I ran around, not as a committee man but as a guest of the committee, as I said, doing politics. Never had such a time in my life. Spent lots of money (not my own) rushed from one precinct to another. Got in to trouble for trying to get votes for my man within the 100 ft. limit. Got pitched out of an auto, told all kinds of seasonable and unseasonable stories, apropos of everything and nothing. Got pinched for falling thro somebody's glass door, and then the other man got elected. Yet there are some people who accuse the committee of trying to serve their own selfish, political ends. What d'ye think of that? Has any one ever noticed how difficult it is to make up one's mind what to do when alighting from a street car, or even what to do when in crossing the street, one has to wait to let a car pass. Let the unfortunate pedestrian stand say 2 or 3 ft. from the car, and he will be painted from head to foot with tobacco juice. If however he stands far enough away to avoid this extremely amusing and characteristic American pleasantary, he will no doubt be scooped up by an auto. I mention this just to call attention to two ways of being amused. San Francisco is a city of amusements. I rode on a car the other morning, two other men were also on the car. We were all on the front end. We passed a building in course of erection. One man said to the other, "What is that going to be." "I don't know" was the answer, but it will probably be a rooming house or a nickelodeon." We had another election the other day, the one on Charter Amendments. This election excited me more and came nearer getting me into jail if possible than the one preceding it. I was particularly interested in Amendment No. 18 relating to the age limit at which a man might enter the Fire Dept. in any capacity. The Charter at present provides that all persons enter-

ing the service of the fire dept. shall be not more than 35 years of age and not less than 21 year of age. Now if this rule were lived up to to the letter, and if the example of the city Charter were followed by private firms, the limit of a man's usefulness to his fellowman would be 14 years; after which—what? Our old friend the Psalmist of whom I presume many have heard, took time, in the midst of his lamentations (and he always had some kick coming) to tell us that the duration of a man's life was three score years & ten. We shorten this phrase to suit the rapid condition of modern times and say—70 years. Our present charter prevents a man over 35 years old from entering the fire dept. Why?—because after having passed that age the man is considered physically unable to handle himself—too weak to hold on to a horse, go up a ladder or to sustain the weight of his helmet; but, between the ages of 21 & 35 he is supposed to be fit for anything. If then in view of this, he is permitted to join the fire dept. he should logically be expunged from the map as soon as he passed his 35th birthday. Should this really be the case he would spend 20 years in getting ready to hold a 14 year job. A portion of this time would be spent in getting born, going to school, learning to roll & smoke the succulent & juicy cigarette, dodge his creditors, also autos, and receive instruction in the art of voting early & often. Then when the fatal day comes i. e. the 35th birthday, he finds himself down & out, but with still 35 years left out of the 70 supposed to be originally coming to him in which to become a tramp or a bum or an unmitigated nuisance to himself, and those around him. Of course this is merely an illustration designed to show the inconsistency of a law of this kind. As a matter of fact the fireman really lasts much longer when once in the dept. the length of his career probably being attended to by an open elevator shaft or something. Charter Amendment No. 18 was introduced for the purpose of correcting to some extent this unjust state of affairs and provides that a man may join the fire dept. between the ages of 21 & 55 years, in the capacity of Master or Pilot in the fireboats, engineers on same, engineers in the pumping stations, and clerks & machinists in the corporation yards, and similar positions where great activity in holding on to hose, running up ladders, breaking things up generally & falling down elevator shafts is not necessary. I may also add, that the men who introduced this amendment waive all right & title to a pension, without in any way desiring to take the pension away from those who earn it. This amendment I am sorry to say encountered the most extraordinary opposition, from all sources. Why, I can't for the life of me see. Its passage could not possibly do any harm to any one and would be a great benefit to many. That it did pass with no particular credit to the supposed liberal spirit of San Francisco, for it only carried by 388 votes, showing that nearly one-half of the voters of San Francisco are willing to either be chloraformed when past 35, or else willing & seemingly anxious to bum on the community for 35 years. According to the papers, the Merchants' Ass'n, The Chamber of Commerce, The Down Town Ass'n, and nearly all the Improvement Clubs went on record as opposing it. I got awfully worked up about it. I had a political job coming to me. I couldn't take it, simply because thro an oversight on the part of my Father & Mother, I was born ten years too soon. Then I went on the warpath. Commencing by severing my connection with an Improvement Club which had suspended me 3 months previously for non-payment of dues, and of which fact I was in ignorance and winding up by sending a letter to the editor of one of our leading dailies on account of an editorial in which he said, that No. 18 should be voted down, because it was designed to make these boats, pumping stations, etc., "asylums for old men" and calling attention to the fact that men in the fire dept. should be young, active, robust and physically able to cope with a great conflagration at any time. I am calmer now the amendment has carried, but I will give the letter verbatim:

San Francisco, Nov. 14th, 1910.

Sir:—Enclosed find clipping from today's paper. My time is too limited as is also my vocabulary to give you the roasting you deserve. However, as I am over 35 years of age, I am physically unable to earn enough to pay for the luxury of reading your paper, you will therefore stop its delivery to the above address at once. As I am over 35 years of age, I am physically unable to earn enough to patronize anyone of the broad and liberal minded individuals composing the Merchants Assn. in future therefore I shall be compelled to send east for my necessaries because, even with freight added I can beat S. F. prices at least 50%. As I am over 35 years of age now, I shall be much older in 1915, as I shall no doubt by that time be still further physically a "has been" I shall probably be unable to afford to visit the Exposition: Therefore, as I don't care, under the circumstances whether it gets here or not I shall vote against Amendment No. 1.

It is the duty of an engineer, either on a fire boat or in a pumping plant to furnish water in case of fire, as he is not called upon to do this with a hand pump I fail to see where he has to be physically qualified to vigorously do any fighting.

Respectfully, etc., etc.

This letter was written in the height of extreme anger, and conveyed by sentiments to the letter, but as I generally borrow a paper no one was out much, and as to sending east for anything—that is a doubtful experiment. I once sent for a suit of clothes, and after waiting for several weeks, received a parcel, which upon inspection was found to contain 3 scrubbing brushes, a pair of carpet slippers, 200 clothes pins, 6 cans of kippered herring and a pair of corsets. It occured to me at the time that some mistake had been made somewhere. The experiment was not a success. A friend of mine once eat two castor oil beans as an experiment—he told me afterward that the experiment had been most eminently satisfactory. Really, we must all work together for our common good, boost the city & the state—patronize each other—work for the fair, and get it, or we may go off the map. Let the coming Christmas actually be, in action as well as in name, a season of "Peace on Earth, Good will toward men," and may each birthday as it comes and goes, find us more charitable, more kind and more desirous of helping those who perhaps thru a mistake in selecting their parents are less fortunate than we are.

(Note):—The editor of this "Journal is not responsible for any of the foregoing nonsense. I am prompted to offer it in the hope that I may run the risk of getting the paper sent to me free for the coming year. If it is not accepted, I shall have to borrow it like I do the daily—or buy it which is distasteful.

PEAT BOG FIRES.

The Pacific Telephone & Telegraph Company recently encountered an unusual situation in the course of the repair of a pole line between Holt and Middle River, small stations on the Santa Fe Railroad between Stockton and San Francisco, as described by J. F. Lowrie in the company's magazine. Investigation showed that standing poles were completely burned off at the butt at a level with the ground, there being absolutely no support but the aerial wires. For a distance of about 8 miles the lead passes through a section of peat bog or marsh, which for the greater part of the year is covered with water. However, there is a period of about four months in the summer during which the water disappears and the bog dries out to a great extent. At times the peat is ignited by camp fires or lighted cigarettes and cigars thrown from the car windows of passing railroad trains, and while no flame is apparent, the fire burns rapidly under the ground and its first indication is from thin columns of smoke which arise through crevices or holes in the ground at a distance of from 20 to 50 ft. apart.

The lead was originally built through this country about ten years ago and consisted of 30 ft. square cedar poles. From time to time local patrolmen have had occasion to re-set and later on to stub poles, the trouble being attributed to grass fires, and as these have not been an uncommon source of annoyance, this particular trouble was not given special consideration until recently.

It has been necessary to replace 200 poles within a distance of about 11 miles, and in order to provide for their protection in the future the scheme of encasing 7 ft. of the butt end of the pole in a jacket of reinforced concrete has been adopted. The method of placing the casing is as follows: First, "junk" strand is placed longitudinally from the base of the pole to a height of 7 ft., and spaced about 2 in. apart. One-inch iron wire mesh is then wrapped around the pole over the strand and securely fastened, care being taken to cover the bottom end of the pole. Then concrete made of 3 parts sand to 1 part Portland cement is plastered to a thickness of ¾ in. over the pole, and it is allowed to thoroughly set before the pole is placed in the ground. The approximate cost of placing the concrete casing is $1.60 per pole. As this protection has not as yet been thoroughly tried out it cannot positively be said that it will serve the purpose intended, although satisfactory results are confidently anticipated.

The Santa Fe Railroad Company has been bothered constantly by these fires, although no serious trouble has resulted therefrom, due to a close watch for the fires and extinguishing them before the undermining of the roadbed. The company has been fighting peat bog fires for the past ten years for about six months every summer at an expense of approximately $75.00 per day. Many methods were employed but none were entirely satisfactory until that now used was adopted. Merely flooding the surface is not sufficient to extinguish the fire, because the water in percolating through the hot fibrous peat is heated to the boiling point and escapes as steam. The method used at present to fight the fires is to force water under high pressure into the burning mass. For this purpose a fire train has been equipped with hydraulic pumps which pump the water out of large drainage canals on either side of the right of way. The pumps are installed in box cars and receive the water through 8 in. reinforced suction hose and discharge it through 3 in. fire hose. The equipment consists of 2 pumps, about 150 ft. of suction hose, and 1500 ft. of discharge hose. The fire crew is composed of one engineer, one fireman, two pump tenders, one conductor, one brakeman, one foreman, and nine laborers.

Generally speaking, we have found that the peat encountered is a kind of soil formed by the partial decay of aquatic and marsh plants which is covered each year by detritus deposited by the flood waters. During the summer months the peat dries down to a depth of three or four feet, depending upon the level of the surface water. The fibrous strata of peat in the lighter and more spongy varieties, when dry, are exceedingly inflammable. As far as we have been able to learn, peat bogs are practically unknown on this coast, and in fact appear in only a few localities in the United States.

IRON AND STEEL BY ELECTRIC PROCESS.

Experiments to produce iron and steel from Norwegian ores by the electric process have been made during the last three or four years, partly by aid from the Government, in response to a petition sent to the Department of Commerce and Industries by the Christiania Polytechnical Society. Private interest has in this manner been awakened, and the industry now promises to become one of considerable importance. The Norwegian iron ore is often so poor that smelting by the old process was found profitless.

The owners of a paper mill at Tinfos, in Notodden, Telemarken, Norway, have for some time been making experiments for the purpose of producing iron by smelting iron ore by the use of electricity as the source of heat. The works were completed in February last, and there has already been an output of 250 tons of iron. The ore used has been mined partly at Lango, near Kragero, and partly at Klodeberg, near Arendal. The melting was accomplished by the use of an electric furnace of about 500 h.p. This is the first iron produced by the new process, and in commemoration of the event there has been cast and sent to the Christiania University an ingot of the metal weighing 60 kilos and provided with an appropriate inscription.

A stock company, styled the Hardanger Electric Iron and Steel Works, is at present being organized. The capital stock is to be $294,800, of which there has already been sold $160,800. There are 4400 shares of $67 each. The works are to be located at Ullensvang, in Hardanger, on the west coast, and the object is to produce iron and steel from Norwegian ores by a patented electric process of Swedish origin. The company has secured electric energy from the adjoining water-power at Tysse, for a period of thirty years, at a cost of $8.04 per h.p.; 4200 h.p. will be required. The ore to be used is to be brought from mines in other districts on the best obtainable terms. The transportation of the ore will be found expensive, but it is believed that this drawback will be offset by the cheap power and excellent harbor facilities at the place.

GAS PROSPECTS IN HARNEY VALLEY, ORE.[1]

BY CHESTER W. WASHBURNE.

The gas prospects in Harney Valley, Central Oregon, are located at places near Malheur and Harney Lakes, 90 to 105 miles directly southwest of Vale. The region is underlain by tertiary lake beds, which are probably equivalent to the Payette and Idaho formations of the Snake River Valley.

The valley was visited by the writer in 1899, before prospecting began, and the following information about the wells has been kindly furnished by Mr. R. B. Post of the water-resources branch of the Geological Survey, stationed at Burns, Ore.; by the officers of the Harney Valley Oil and Gas Company, and by others.

In February, 1909, a strong flow of gas was struck at a depth of 357 feet, in a well drilled for water by John Leake about 15 miles south of Burns, Ore., in the SW. ¼ sec. 28, T. 25 S., R. 32 E. The gas is said to have forced the tools out of the well and to have "hurled sand and salt water into the air to a height of 40 feet." In October, 1909, the flow of gas still continued, but with diminished pressure and small volume.

From a sample of the sand thrown out of this well, a "very small quantity of oil" was obtained by C. E. Bradley, chemist of the United States Experiment Station, Oregon Agricultural College, Corvallis, Ore.

The well is only 2 inches in diameter at the bottom and was drilled with a "light hydraulic rig."

Along the north shore of Harney Lake, 12 to 15 miles southwest of the Leake well, mentioned above, 11 prospect wells, 74 to 252 feet deep, have been drilled by the Harney Valley Oil and Gas Company, of Burns, Ore. The wells are half a mile apart in secs. 20, 21, 27, 28, 29 and 30, T. 26 S., R. 30 E.

Traces of gas are reported from all the wells, the heaviest flows being derived from depths of 74, 150 and 252 feet, from different wells. The quantity of gas obtained was not of commercial significance, but the wells are too shallow to test the field, and until deeper wells are drilled no conclusion can be formed as to the amount of gas available.

All the wells, including the Leake well, were "drilled with a light hydraulic rig, with which it was not possible, on account of the heavy gas pressure, to penetrate below the sand in which the gas was struck."

The strata penetrated by the wells in Harney Valley are of the same general character as those in the Snake River Valley, with which they are probably continuous except as they may be interrupted by two or three ridges of volcanic rocks. The nearest marine deposit known to the writer is the Jurassic red sandstone at Red Butte, in the foothills of the Blue Mountains, about 20 miles north of Burns.

The rocks of Harney Valley have a general synclinal structure, the dip steepening toward the central part of the basin to angles ranging from 3° to 10°. Indications of minor folds and faults have been seen, but geological work in that region is still too imperfect to permit the exact location of these features of the structure. Since this report was written a paper by Gerald A. Waring on the geology and water resources of the Harney Basin region, Oregon, has been published by the Geological Survey as Water-Supply Paper 231, from which it appears that the sediments in Harney Basin overlie the lavas and probably do not exceed a few hundred feet in thickness. They therefore cannot be equivalent to the Payette formation, as suggested above. This new information makes it improbable that more than a small amount of shallow gas can be obtained in the basin.

[1]Extract from Bulletin 431A, U. S. Geological Survey.

DIFFICULT TELEPHONE CONSTRUCTION.

An interesting piece of heavy toll line construction recently completed by the plant department of the Pacific Telephone & Telegraph Company between Bakersfield and Castaic Junction, forming a part of the San Francisco-Los Angeles valley route, is described in the company's magazine. There were numerous factors to be considered in this connection, such as the existence of high tension parallels, elimination of submarine cables, coast fogs and reduction of wire mileage to the minimum,

The diagram illustrates the old route of the Los Angeles-Bakersfield line and also shows that taken by the new line, which permitted the shortening of the lines between these points by 39.6 miles. As two power companies, each carrying a pressure of 60,000 volts had already selected their routes, taking full advantage of the highways, and as it was necessary that a sufficient distance be kept from their lines, it was found impossible to follow any existing roads through the Tehachapi Mountains. After a comparison of costs, it was shown that a saving of approximately $20,000 could be made by constructing roads, compared with the cost of following the old route. In addition, the new route would give better efficiency.

DISCUSSION OF PAPERS AT EIGHTEENTH ANNUAL CONVENTION PACIFIC COAST GAS ASSOCIATION.

Relations With the Public.

Mr. Basford: Mr. President, there is one thing brought to mind in this paper, and that is, the gas appliance men's part of it. I do not know whether the gas men at large realize that the gas appliance men can unwittingly be of any great damage to both the consumer and the gas company. Many times it is due to lack of knowledge and other times it is the easiest way to get out of the trouble by laying it on the gas company. The companies could give data to appliance men with regard to the proper answers to ordinary complaints from the consumer, so that no matter how anxious the appliance man is to keep harmony, that he will not make a statement that is derogatory or detrimental to the gas company, but he will answer properly or at least turn the complaint over to the proper department for adjustment. On the other side the employes of the gas company who have willfully spoken against any gas appliance which, in the opinion of the company, is worthy of use by the consumer, should be severely dealt with. They should be given instructions to report the complaints to the company selling the appliance if it cannot be properly adjusted. Gas appliance men know it is easy for the gas company employe, if you have such and such a device, to say, "That is all wrong; that is no good." I know that is done too often. On the other hand it is just as important that the gas appliance men should not throw the blame on the company, and therefore, I believe that some way should be devised by the companies at large to settle little troubles and differences that may arise, and keep things working in harmony.

Mr. Berkley: I want to say that I think Mr. Kennedy has struck the key-note of establishing relations between the public utility corporations and the public better than anything I ever heard. I know of no man better able to speak on that subject than Mr. Kennedy. I want to say that I so heartily endorse what he has said that I think if this document had been promulgated ten years ago there would have been a different feeling between the public and the corporations.

I want to say one more thing. Mr. Britton said, "Like masters, like man." The Edison Company has a written notice, and has had it in its public offices for years, hanging in a little frame, that outlines distinctly the relations of the company with the general public. I have never gotten away from that since the time I was employed there, and I believe that if we men would take this same doctrine into our business, and our work-aday lives, a good deal of friction would be removed. Take the little thing of the telephone, for instance. The telephone is undoubtedly the greatest means of modern business communication. It is more distinct than a letter. A cross answer over the telephone causes the consumer to immediately damn the whole company. I believe, gentlemen, we will under-estimate this paper unless we thoroughly consider its teaching, and I move a vote of thanks be tendered to Mr. Kennedy for this most valuable paper. (Carried).

Mr. Britton: I don't feel that we should pass Mr. Kennedy's paper with a mere perfunctory motion. I agree it is the best exposition on that subject I have ever listened to. What you are aiming to do, and what Mr. Kennedy is aiming to do is to bring home to the man in the homely truths he has stated. I think that if the companies represented here would, as soon as Mr. Kennedy's paper is published, call together the men who are responsible for the conduct of the company toward the public, and read that paper to them and furnish copies to take home and read, and see that meetings are held with the subordinates at least once a month, so that they will be taught from the mouths of the men that direct them the spirit of the company that then, and then alone, will the paper do some good; but let it rest here in our own body and congratulate ourselves on having a man big enough to place truths before us in regard to our attitude to the public—that will accomplish nothing. I think the companies represented here should get into close daily contact with the men so that the men would know what your policies are.

General Policy Regarding Pipe Extensions.

Mr. L. P. Lowe: I would like to ask Mr. Luckenbach what he considers a bonus.

Mr. Luckenbach: I would consider a bonus the payment of any money for extension of a main.

L. P. Lowe: What do you mean by "payment"—that is a rather broad statement.

Mr. Luckenbach: I believe gas mains are intended to enable consumers to obtain gas from those mains and the revenue should be from consumption. In other words, I should not be permitted to pay the company one penny to lay a main into a vacant tract of land to pay for that extension. The capital invested in the company should be represented by the property of the company.

L. P. Lowe: That does not reach the question yet. What do you consider a bonus? Do you mean the giving of money or payment of money that may, at some future time, be re-paid?

Mr. Luckenbach: I believe an extension should be made without the payment of any money or deposit of any money to be used up or returned at any time.

L. P. Lowe: I can't agree with you. I want to say a little more. This question, if you recollect, came up at the last meeting of the Association. I think Mr. Luckenbach was there. I called your attention to many instances wherein I thought that companies, and especially small companies, could seek assistance from consumers, wherein the payment was not at all in the nature of a bonus. If I understand the meaning of the word "bonus," it means the outright giving of money and not a loan. I know of several instances wherein people have wanted gas in localities in which it was entirely out of the question for the companies to supply it, as the business would not warrant the extension, and in those cases, which have been accepted time and again, that the consumer advance the money and which would be re-paid in gas. A company in which I am interested supplies a district which took three or four miles of pipe, and in which there were but three or four houses when the pipe was laid. The work was done by money advanced, on the re-payment plan, by a real estate concern owning the tract, and if that concern wished that pipe for the purpose of aiding in selling the property, would it be right—would it be just and equitable; would it be common sense for the company to refuse to extend the pipe under those circumstances, and would you think that was a bonus?

Mr. Luckenbach: I would not extend the main except upon the idea of revenue basis to the company. I believe it works injury to the company which is far greater than any benefit which may be derived from the bonus, and I believe the very man who agrees to pay is going to be the eventual enemy of the company and fight it.

L. P. Lowe: I can't see the logic of your argument. In many cities, real estate concerns have furnished money to pipe their tracts, as an added inducement, and the cost of which has been added to the sale price of the lots. It is a legitimate proposition, and while I do believe that the company should, in time, reimburse those who paid, I do not believe the real estate concerns should be denied the privilege of paying for the pipe, and turning it over to the gas company. If you will say it is unfair for the gas company to accept money given to assist in the building of works, I will agree with you, but, I submit it is proper for a company to accept money in the way I have stated.

Mr. Luckenbach: Mr. Lowe, you speak of payments to be returned. My proposition is that wherever a consumer, or would-be consumer, is permitted to contribute in any way to the extension of the system he is at heart an enemy of the system, and of the company which permits him to do it, and it finally works more harm to the company than good. I could show you cases of the kind to which you refer where the very men that

paid for the extension stated that they would fight the company, and go to other companies if they could get service from them. I believe that the time comes when a man feels hard to the company that has made him pay for what his neighbor gets for nothing.

L. P. Lowe: Do you speak of unoccupied territory, or territory in which the company should justly extend its pipes, where business is procurable? Of course we all know it is the general policy of a company to extend 100 feet to reach an average consumer, but there have been many places in California where tracts have been piped by the owners of the land as mere real estate speculations, and without which they could not sell the land. On the repayment plan, if the business comes they get their money back, and if it does not the company has not wasted its capital. I don't call that a bonus.

Thaddeus Lowe: Mr. Luckenbach made a statement a few moments ago that he didn't believe in making any extension unless it was going to bring some revenue to the company. I think he is quite right. Neither do I believe that a tract where there are a great number of consumers, or a few consumers, should be left without gas at the dictates of the company, simply because they didn't consider the consumers sufficient in number to make a profitable return to the company. Now, it is the duty and privilege of the gas company, I think, to direct business to itself or to its territory, and if there is a large vacant tract of land that some real estate man is having piped, you know by serving that tract of land with all modern conveniences you are going to build it up, and you are going to increase business on your system. There is no question about that. We have one case of our own. There was a large tract of land that only two or three years ago was alfalfa fields. Today there are 150 homes on it, and if it were not for the fact that the real estate men put up that money, and which the company agreed to pay back, they never would have got their gas in there, and we never would have the business. Through the comments of those men we find the policy good. The territory has been developed and the gas mains through there have been the principal things that developed it. The surrounding tracts have all the other advantages, but no gas, and consequently no homes. I think some of our best friends are people for whom we have made extensions at their original expense, and ultimately paid them back. They not only got their price for their land, but they added the cost of piping as well, and which they again got back from the company.

Mr. Berkley: I have always taken the position in the matter of extensions that if people come to the office for service, that there should be some way in which the company should give them service. I think that if a man comes to your place of business wanting service, and he is told the mere fact that there is not enough business along the line, and he can't get service under any circumstances, he is more liable to be your enemy than if the position of the company was tactfully explained, that the business would not justify the expenditure, and leave it to him if he wants to get an extension by depositing a certain amount of money, and I am rather inclined to think that man would be better satisfied than if he was turned away, and could not get service at all. I think in collecting money for extensions from a consumer, a difference should be made as to whether the money is deposited as a bonus or simply put up as a deposit to be returned on certain conditions—so much in case of one connection, as Mr. Lowe has pointed out, and so much additional for each connection. If the amount would be a bonus, not returnable, I believe we should be a little careful as to the size of the bonus required. If the money is to be deposited you ought to extend to that consumer the ordinary courtesy of building the one hundred feet, and have him deposit the difference. returnable as other consumers come in. A number of extensions have been made on that basis and in the majority of cases—I cannot say all cases—in the majority of cases people who have deposited money have been well satisfied with the result and I think it is far better from our standpoint as companies, to give everyone coming to the office some way of getting service.

Mr. Schade: I would like to ask a question, and that is, I would like to know how much of the annual dividends the company is willing to pay the people who give bonuses.

Mr. Berkley: The amount of the bonus would be part of the earnings of the company, and that earning should be considered in the matter of the fixing of the rates of the company. In that way it is worked back. It would work an injustice upon the rest of the consumers it seems to me, to require the companies to put extensions into non-paying territory. It would simply be justice to the rest of the consumers from a rate question. What right have you to go into a non-productive territory where you would not earn one or two per cent and fix a rate on that? In other words, how can we ask the downtown consumers to help us pay for the outlying districts?

Thaddeus Lowe: In returning loans for extensions, sight should not be lost of taxation and depreciation, on non-productive piping. Where there is no business we should not pay for those items—the man who is benefited should.

Mr. Farwell: I think we are getting a little bit mixed between the owner and the consumer here. The owner of the tract, in paying something toward the cost of bringing gas mains to the property, is a disinterested party after the property is sold, unless he resides there and if he has accomplished his purpose of disposing of his property he is satisfied. The companies—electric companies and gas companies see fit to make a reasonable charge for these extensions to the owners of the property or companies, such as real estate companies, and thus enable them to market their property readily and it seems to me that they would be more satisfied than if the gas or electric companies denied them that privilege.

Mr. Keyes: I would like to state one instance that occurred some time ago. A real estate firm who were starting an addition, voluntarily made the proposition to pay the full cost of the extension in cash, provided we would make the return, and we accepted the offer in a district where there was not a single house, and not likely to be one, and he advertised that gas and water would be extended there, and inside of three weeks eight fine residences were started, which shows it is a good business proposition.

MAP OF WHITTIER-OLINDA OIL FIELD.

The California State Mining Bureau has issued a map of the Whittier-Olinda oil field, in Los Angeles and Orange Counties. To make the map complete, a large number of original maps and surveys were used. These were furnished by the Santa Fe Railway system, the Puente Oil Company, the Standard Oil Company, the Los Angeles Gas and Electric corporation, the Brea Canyon Oil Company, the Murphy Oil Company and others. Data was furnished by most of the operators in the field and also by others. A bulletin is in preparation that presents much information that has not been published regarding Whittier-Olinda and other Southern California fields. The Whittier-Olinda map was drawn by Paul W. Prutzman. Upon it are indicated the producing wells, the drilling wells, the abandoned wells, the wagon roads, the railroads, the pipe lines, the gravity of oils produced and other particulars that are necessary to convey the fullest and most accurate information regarding the field. This thoroughness characterizes the entire bulletin concerning the oil fields that has been in preparation for some months and that will be, when it is issued, the most comprehensive handbook on California petroleum and California petroleum fields that has been published. The Whittier-Olinda map is on sale at the California State Mining Bureau. The price is 40 cents, with 4 cents postage added.

BOOK REVIEWS.

Edison, His Life and Inventions. By F. L. Dyer and T. C. Martin; two volumes, 999 pages, 5½x8½. Harper & Bros., New York City, and Technical Book Shop, San Francisco. Price, $4.00.

This is pre-eminently the gift book of the year for an electrical engineer. Like all good biography it is intensely interesting history, vitalized by the personality of this master workman, whose useful life has been synchronous with electricity's practical development and for much of which he has been the prime mover. In a recent number of the Outlook, the Spectator, a mere layman, lists the telegraph, the telephone, the phonograph and the flying machine as successive claimants to the distinction of being the "eighth wonder of the world," yet Edison is the man that made realities of all but the last of these wonders and this in face of almost insuperable obstacles. A better selection of biographers would have been difficult, for Mr. Dyer has long served as general counsel for the Edison interests, while T. C. Martin is recognized as the peer of electro-technical writers. By means of anecdote and memoir they intimately introduce to the reader the personality of the man and lead to an understanding of the unusual persistance and indefatigable energy by which his achievements have been accomplished.

His most important inventions and the ones to which the major portion of these two volumes are devoted have been in connection with the stock ticker, the telegraph, the telephone, the phonograph, the incandescent lamp and lighting system, the electric railroad, magnetic ore milling, Portland cement, motion pictures and the storage battery. Here is science sugar-coated for the layman, yet useful for the technician. Here are the cold hard facts about electricity attractively presented in an atmosphere of romance more thrilling than a novel, but withal a story of real life. What drama can be more powerful than this account of a poor boy who gradually forces himself to the position of a pioneer on the frontier of scientific investigation, making fortunes in a year and spending them in a week, yet always undaunted and always succeeding? The discovery of the Mesabi iron range nullified a decade of his work and two millions of his money expended in search of a magnetic process for milling of iron ore, yet this seeming failure has been the means of revolutionizing the manufacture of cement. The narrative account of each of these great inventions is ably supplemented by an appendix which gives their theory and practice. Concluding chapters briefly summarize the legion of other patents which he has been granted; describes his methods, his laboratories, his business ventures and the commercial side of his work as well as the litigation in which he has been involved and the recognition which he has been accorded. There is also a copious index which makes the book valuable for reference work. On the whole the facts are authentic, the details complete and the treatment inspiring.

Electricity, Experimentally and Practically Applied. By Sidney W. Ashe; 349 pages, 5x8; 422 illustrations. D. Van Nostrand Co., New York, and Technical Book Shop, San Francisco. Price, $2.00.

This book gives an excellent practical account of the action of the various types of electrical apparatus in ordinary use. The text is clearly written and logically arranged and most of the illustrations are of up-to-date machines. After a concise presentation of the intimate connection between magnetism and electricity, and a brief summary of the theory of direct current apparatus, the author illustrates and describes the more important types of primary and storage batteries, the action of electrolysis, the three wire system, electrical measurements, motors, lamps and meters. The last four chapters are devoted to an elementary explanation of the theory of alternating currents, the transformer, the induction motor and the rotary converter. Higher mathematics has been carefully eliminated and all explanations are illustrated by experiments so simply described that the manual may well be used by a student having no instructor. It is typical of the practical course of instruction usually given to those men working with and familiar with electrical apparatus, but not acquainted with its theory.

The Tesla High Frequency Coil. By G. F. Haller and E. T. Cunningham, 119 pages, 5x8, 56 illustrations. D. Van Nostrand Co., New York, and Technical Publishing Co., San Francisco. Price, $1.25.

Directions for the construction of Tesla high frequency coils are herein given, taking up successively the transformer, the interrupter, the condenser and the oscillation transformer, stating full details for winding and insulation as well as directions for assembling. The drawings and dimensions are intended for a 12-inch coil, specially designed to give a high frequency discharge at great volume. Its principal uses aside from wireless telegraphy are briefly illustrated, including directions for obtaining the more spectacular effects which astonish the visitors at our electrical exhibitions. The concluding chapter gives details for a 7-inch standard coil.

The Telegraphic Transmission of Photographs. By T. T. Baker; 141 pages, 5x7; 64 illustrations. D. Van Nostrand Co., New York and Technical Book Shop, San Francisco. Price, $1.25.

This volume brings together the history of the attempts that have been made to transmit photographs and pictures by means of the telegraph and briefly describes the selenium process of Professor Korn, the telautograph of the same worker, the Thorne-Baker telectrograph and the Belin telestereograph. In each case the apparatus employed is described and the results obtained illustrated. These systems have been from time to time described in the various technical papers but are here for the first time brought into one volume, whose convenience and comprehensiveness should commend it to those interested in this subject.

Dynamo Electric Machinery. By Samuel Sheldon and Erich Hausmann, 328 pages, 5x8; 210 illustrations. D. Van Nostrand Co., New York, Technical Book Shop, San Francisco. Price, $2.50.

The fact that a book has reached the dignity of an eighth edition within less than ten years shows rather conclusively that it at least meets the requirements for which it was written, in this case a text book for engineering students. Since its initial publication, the great advance which has been made in the electrical world has made necessary the complete re-writing of all but the first two chapters which present elementary electrical and magnetic laws and facts. It deals only with direct current machines and is intended as supplementary to laboratory work. This text is so well and favorably known that a summary of its contents is unnecessary here.

Wireless Telegraph Construction for Amateurs. By A. P. Morgan; 188 pages; 5½x8; 147 illustrations. D. Van Nostrand Co., New York, and Technical Book Shop, San Francisco. Price, $1.50.

This is essentially a book of practical information regarding wireless telegraphy for the novice. After a brief treatment as to theory, the author takes up the receiving apparaus, illustrating various commercial instruments and diagrams for the construction of aerials. In the same manner all the apparatus necessary for the sending work is detailed, whereby the amateur may make his own induction coil, interrupter, transformer and condenser. Succeeding chapters deal with the various types of detectors which have been devised and present practical hints as to operation. By its use it is possible for anyone of average ability to construct and satisfactorily operate his own system.

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Entered as second-class matter at the San Francisco Post Office as "The Electrical Journal," July 1895.
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Additional Sources of Power

In these days of conversation about conservation and delightful theories about protecting natural resources for those who will follow us three or four thousand years hence, it is refreshing to know that new sources of power are constantly being found. It is but a few short years since California was handicapped by lack of cheap fuel, but how abundantly has this want been supplied from her mountain streams and the oil of her subterranean recesses. It is of general knowledge that westward from the one-hundredth meridian of west longitude the soil is underlaid in many places with incalculable quantities of lignite, but it is not so generally known that this much despised substance is susceptible of supplying cheaper power than the finest anthracite coal.

Recent tests at the Government fuel testing plant proved that lignite when used as a fuel in the gas producer can do more work, ton for ton, than the best Pennsylvania or West Virginia coal when burned under steam boilers. Coal utilized in a gas engine through the medium of the gas producer has been demonstrated to have more than double the practical efficiency as when used in the steam engine and boiler. Though these facts have long been known and have found extensive application in England and Germany, the prodigal American continues to waste high grade fuel for work which could be better done with lignite. The producer will handle any fuel which contains more than twenty per cent of combustible matter, so that there are also many other waste products, such as peat and beet sugar refuse which may be utilized for power.

These facts are vital to the industrial development of all the western states. North Dakota alone is estimated by the United States Geological Survey to have five hundred billion tons of lignite underlying a portion of its area. The same authority gives Montana three hundred billion tons, the San Juan field of New Mexico, one hundred and thirty billion tons, summarizing by the statement that the available aggregate of lignite and subterranean coals in round numbers is something more than a trillion and a quarter tons. Though these figures almost baffle our comprehension they show that there is no immediate danger of a fuel famine.

With this stupendous showing the importance of the gas producer and the commercial potency of electrical energy in the arid regions of America is too manifest to require comment. It makes possible the establishment of central electric power plants, each transmitting current throughout a region representing a huge circle whose circumference would be more than 1600 miles, these great plants using producer gas and fed by fuel cheaply procured from local lignite beds. This could be done at a price which would allow the use of electricity for every need of power, lighting and heating service. In a prophetic address before the Institution of Electrical Engineers, incoming President Ferranti outlined such a comprehensive scheme for the industrial rescue of Great Britain from the difficulties now threatening and which will in time also menace the prosperity of this country.

PERSONALS.

C. L. Cory has returned to his San Francisco office from Los Angeles.

H. R. Noack, of Pierson, Roeding & Co., is visiting at Portland and the Pacific Northwest.

George Cressey of the Modesto Gas Light, Coal and Coke Company, was a San Francisco visitor this week.

W. H. P. Hill, manager of the Monterey County Gas & Electric Company of Monterey, was a recent San Francisco visitor.

John Coffee Hays, general manager of the Mt. Whitney Power Company of Visalia, California, has returned from a trip to New York.

W. S. Heger, California manager of the Allis-Chalmers Company, is again at his San Francisco office after making a tour of Southern California.

A. H. Cheney, of the sales department of the Brooks-Follis Electric Corporation, has returned to San Francisco from a Northern California trip.

Joseph Victor Kunze, Atlantic manager of the Pelton Water Wheel Company, with headquarters at New York, is visiting the Pacific Coast offices.

H. C. Goldrick, Pacific Coast manager of the Kellogg Switchboard & Supply Company has returned to San Francisco from a trip to Bakersfield and vicinity.

A. H. Snead, superintendent of the Nevada, California & Oregon Telephone Company, with headquarters at Reno, was a San Francisco visitor during the past week.

Delos A. Chappell and Messrs. Dietert and Cain of the Hydroelectric Company of Bodie, have been spending a few days at San Francisco. Mr. Cain is one of the largest mine owners in the district.

A. A. Dittrick, recently with the Western Electric Company at Seattle, and formerly with the Cleveland Construction Company of Cleveland, Ohio, is at San Francisco, where he hopes to make permanent connections.

N. Ohno and K. Nishimura, mechanical engineers with the engineering department of the Japanese house of Mitsui & Co., are visiting the firm's San Francisco branch. They have been making inspections of electrical power installations and engineering plants in this country.

John F. Stevens, the engineer who has charge of the construction of J. J. Hill's new railroad projects in Central Oregon, was a San Francisco visitor during the past week. He was the first chief engineer of the Panama Canal and resigned that position to take a more lucrative one with the Metropolitan Street Railways of New York City.

Harris J. Ryan, professor of electrical engineering at Stanford University, will present a paper on atmospheric conductivity at the January meeting of the San Francisco Section of the American Institute of Electrical Engineers. This will be published in the January Proceedings of the Institute. Professor Ryan will also talk on this subject at the New York meeting on January 13th.

Paul Shoup, vice-president of the Pacific Electric Railway Company, has returned to his San Francisco office after spending two weeks at Los Angeles. It is announced that Mr. Shoup will in future be the directing head of this Southern Pacific interest. It is reported that the electric trackage of the system will be increased to about 1500 miles in the future, as practically all of the Southern Pacific's local steam lines entering Los Angeles will be changed over to electric roads. Both freight and passenger service will be operated from points as far distant as Bakersfield, 175 miles north of Los Angeles.

TRADE NOTES.

The Kellogg Switchboard & Supply Company has closed a contract with the Compania Telefonica de Sonora S. A., of Sonora, Mexico, for telephone equipment for the city of Hermosillo. The installation includes a 3-position magneto exchange with 300 lines equipped. A special feature is the new Kellogg 4-party harmonic selective equipment. Charles W. Forbes is general manager of this company, which has taken over the government concession for the entire system of telephone lines in the State of Sonora.

W. Motelius Price Company announce that it carries a complete stock at its Seattle warehouse of the F. H. Lovell Company's marine fittings and gauge glasses, the American Electric Fuse Company's products, and the Murphy Electricity Rectifier Company's rectifiers. They are also agents for the Electric Service Supply Company, Garwood Electric Company, Trenton Engine Company, Machen & Mayer Electrical Manufacturing Company, Queen & Company, The Powers Regulator Company, and the Delaware Hard Fibre Company.

The San Diego Electric Railway Company of San Diego, Cal., has just placed an order with the Westinghouse Electric & Manufacturing Company, Pittsburg, for two 1000-kw., 600-volt, 514 r.p.m. generators to be driven by Westinghouse Parsons low pressure steam turbines running at 3600 r.p.m. The generators and turbines will be connected through Melville-McAlpine reduction gears. In addition to this equipment, the Westinghouse Company will shortly ship one 1200 kw., 600-volt, 80 r.p.m. engine type D. C. generator to the same company.

NEW CATALOGUES.

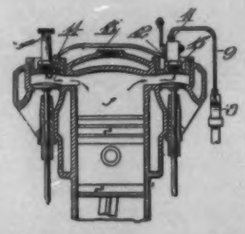
The Crouse-Hinds Company of Syracuse, N. Y., has issued a 9x12 catalogue devoted to panel boards and cabinets. The book is profusely illustrated in two colors and printed on heavy coated white paper, the 80 pages of catalogue being inclosed in an artistically embossed cover with cloth back. Each detail of construction is described tersely, and listings and prices of individual and assembled parts are presented clearly. Panels and cabinets also are listed separately and together.

The Western Electric Company has just issued bulletin No. 1116, describing magneto telephone sets and accessories. The bulletin contains 40 pages and is profusely illustrated with photographs. Several pages are devoted to the desigu and construction of wall and desk sets, and the No. 1317 type wall set is described with attention to the smallest details. The bulletin describes and lists backboards, batteries, battery boxes and gauges, binding posts, buzzers, condensers, cords, desk set boxes, desk stands, flexiphones and flexiphone arms, generators and generator boxes, gongs and gong mountings, hand sets, induction coils, number plates, protectors, protector blocks, fuses, micas and mats, receivers, ringers, switch hooks, test sets, transmitters and transmitter arms and brackets.

An instructive pamphlet, No. 1137 on the principles of construction and operation of watthour meters has just been issued by the Westinghouse Electric & Manufacturing Company. Though in the form of a descriptive circular, the pamphlet goes at some length into the question of rates and the theory of meters, and points out the importance of the various features and adjustments of modern meters, both a.c. and d.c. Even to one reasonably familiar with the subject, the pages on "Selection of Watthour Meters" will bring out valuable points often overlooked. The book describes the latest style of Westinghouse type C induction watthour meters,, with micrometer light load adjustment and permanent magnets so arranged as to be really permanent, both in position and strength. The "ball and jewel" type of bearing and other features are described and illustrated, also a method of meter testing without the use of a stop watch.

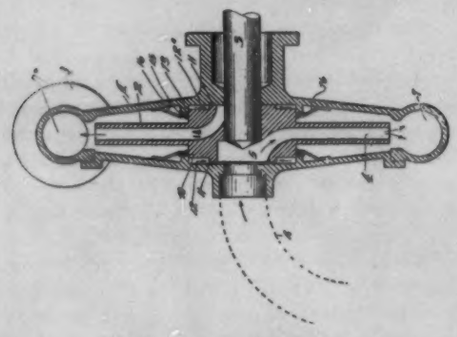
PATENTS

977,007. Gas-Engine-Starting Device. William A. Hansen, San Francisco, Cal. The combination with an internal combustion engine, and a main carbureter, of a supplemental vaporizer, a hydro-carbon supply device between the main carbureter and said vaporizer, and a controlling needle-valve, a



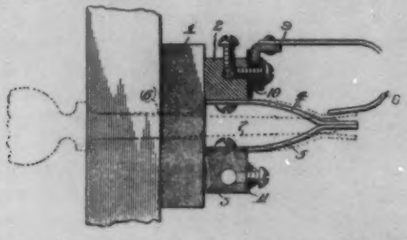
chamber, means for admitting air under pressure into said chamber, a pipe conducting gasoline through said chamber, said chamber having an annular exterior passage for the air, and a distributing chamber into which the mixture is admitted and from which it is delivered to the cylinders.

977,101. Centrifugal Pump. Ferdinand W. Krogh, San Francisco, Cal. The combination in a centrifugal pump, of a casing having central inlet and peripheral discharge passages, an impeller revoluble within the casing, the impeller having curved water ways connecting with the inlet passage and having a hub through the center of one side of which the



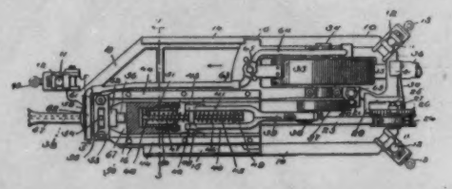
inlet ends of the water-ways open, said hub and the inner faces of the casing having annular flanges forming with the adjacent sides of the casing and hub, intermediate chambers, and said impeller having other passage-ways which are independent of the first-named ones and whose inner ends open through the side of the hub opposite to that through which the inlet ends of the first passages open, both of said passages leading outwardly through the periphery of the impeller.

977,061. Means for Measuring Current in Three-Phase Systems. Carl Wiler, Chicago, Ill., assignor, by mesne assignments, to General Electric Company. Means for measur-



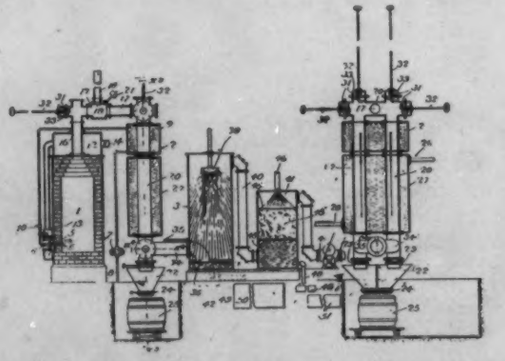
ing the current in each of the phases of a three-phase alternating current system, said means comprising a pair of jacks each provided with a pair of normally closed springs arranged to be opened by the insertion of a plug in the jack, a bar permanently connecting a corresponding spring of each jack, a second bar extending between said other springs and arranged to be electrically connected with either of the same when the plug is inserted in the corresponding jack, transformers included in the circuit of two said phases, each transformer having one terminal of its secondary connected to one of said last-mentioned springs, and a measuring instrument having one of its terminals connected to said first-mentioned bar and its other terminal connected to said second bar and to the other terminals of the secondaries of said transformers.

977,302. Water-Power Mining-Drill. Carl A. Hanson, Seattle, Wash. The combination with a main frame and means for supporting the same, of a second frame slidably mounted upon the main frame, means for manually advancing the second frame upon the main frame, said means including a ratchet



mechanism mounted on the main frame, a cable, and a spring connecting the ratchet mechanism with the second frame, a hammer mounted to reciprocate upon the second frame, a cross head mounted to reciprocate upon the second frame, yielding connection between the cross head and hammer, a drill in position to be struck by the hammer, and a motor adapted to actuate the cross head.

977,000. Process for the Production of Carbon-Black Together with Combustible Gas. Warren H. Frost and Joshua J. Nix, Los Angeles, Cal.; The process of producing carbon black together with combustible gas, which consists in producing a condition of suction in a combustion chamber, continuously supplying petroleum to said chamber, admitting a restricted quantity of air to said chamber to cause partial combustion of the petroleum, the condition of suction in the chamber being such that the resulting temperature is sufficiently high to substantially break up the tarry matter and



to cause the unconsumed petroleum to be decomposed substantially into combustible gas and free carbon, drawing off the combustible gas to maintain the condition of suction in the combustible chamber, and delivering such combustible gas, the petroleum being supplied to the chamber and atomized under its own expansive pressure, exposing the gas to the action of a cooling surface to separate carbon black therefrom, and removing the carbon black from such cooling surface.

INDUSTRIAL

HOUSEHOLD DEVICES FOR CHRISTMAS GIFTS.

Electric household devices are meeting with a rapidly extending use due to the efforts now being made to lift a large share of the burden of household toil from the shoulders of the long-suffering housewife and to the demand for a more sanitary method of preparing food.

Fig. 1. General Electric Combination Gift, consisting of Chafing Dish, Tea Kettle, Coffee Percolator, Toaster and Flat Iron.

Naturally these devices are becoming popular for Christmas gifts. Fig. 1 shows a combination gift consisting of a chafing dish, coffee percolator, tea kettle, toaster and flat iron, all of General Electric make, while smaller combination gifts is shown in Fig. 2.

Fig. 2. General Electric Toaster and Flat Iron.

General Electric heating devices employ heating elements made of calorite, a wonderful new alloy discovered after years of scientific investigation in the extensive research laboratories of the company.

These devices form acceptable gifts and in addition the whole household will enjoy the benefits resulting from their use for years to come. A man cannot give his wife a more suitable present than these household devices, which make her household duties lighter and more interesting.

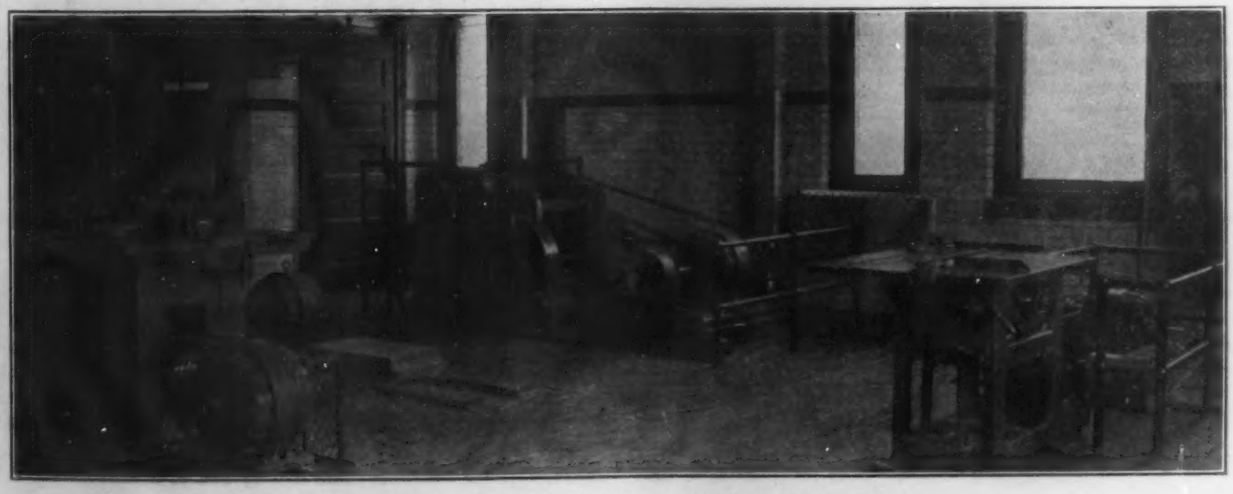
MOTORS PROVE VERY SUITABLE IN VOCATIONAL SCHOOL.

The accompanying picture was taken in a wood-working shop that is a model of its kind. The shop is part of the Vocational School for Boys, New York City. The various machines are driven by individual electric motors, a method that absolutely safeguards the boys against mishaps that occur so frequently in shops where long belts and line shafts are present.

The illustration shows how well electric motors lend themselves to a layout of machinery that precludes accidents. Of course, besides the safety afforded, the motors are economical in their operation, and greatly add to the convenience of the students. Furthermore, if any of the boys are particularly ambitious and desire to work outside of the scheduled hours, they can very easily utilize any one of the machines without requesting that the whole equipment be put into operation.

The Vocational School for Boys is intended for boys who desire an education that will prepare them for industrial work as distinguished from office work. Pupils are afforded an opportunity to learn the elements of a trade, and to study architectural, free-hand and mechanical drawing, while continuing their general education along lines that will best fit in with this work. Everything necessary for the work is supplied by the school; there are no charges of any kind. The course is designed to cover one year or two years of work.

The boys who know definitely just what trade they want to follow, are permitted to start at that work, and devote most of their time to it. Those boys who have not decided on any special work are permitted and required to take several lines of trade work. The instructors then advise the boys intelligently and guide the boys to a wise choice. After this has



Individual Motor Drive for Machine Tools.

been done, the pupils devote their time to the trade selected. All the instruction is individual, although the boys work in groups. There are no regular "classes," as the term is ordinarily used. Each boy is a unit, and he progresses as rapidly as his ability will permit.

The vocational courses offered include woodwork, metal work, printing and bookbinding.

The divisions of woodworking covered are: House carpentry and construction, cabinet making and bench work, wood turning, pattern making in wood, and use of wood milling machinery.

The woodworking machinery includes two rip and cut-off saws, a universal saw, a 4-roll single cylinder cabinet surfacer, a hand planer and jointer, a jig-saw, and a knife grinder. Most of this was made by the Oliver Machinery Company, Grand Rapids, Mich.

The motors are of the induction type and operate at 1700 r.p.m. on 220-volt, 2-phase, 60-cycles. The motors were made by the Westinghouse Electric and Manufacturing Company, Pittsburg, Pa.

AN INTERRUPTER FOR RAILROAD TELEPHONE WORK.

A new interrupter, designed especially for railway telephone service, has just been placed on the market by the Western Electric Company. This interrupter, known as the

Fig. 1. No. 62-A Interrupter Showing Glass Window.

62-A, is especially adapted for use in block towers, where the operators are so busy that they do not have the time to call other stations by means of a hand generator. It is also especially well adapted for use on yard lines where several telephones are connected to the same pair of wires. It is not limited, however, to this class of work, but is efficient in all code ringing work, as the signals, due to the sensitive mechanism, can be made very clear and distinct.

The No. 62-A interrupter, a closed view of which is shown in Fig. 1, is intended to be mounted normally upon the wall in a vertical position in the same manner as a telephone set. The set is enclosed in a neat, well-constructed oak cabinet, provided with a hinged cover. This cover is provided with a glass window, through which the operation of the mechanism can be observed when the cover is closed. The mechanism is mounted upon the base of the cabinet and is readily accessible for adjustment, test and inspection.

The interrupter is operated by means of a key, or push button, which closes a battery circuit containing four to eight dry cells. The number of cells necessary depends upon the number of bells it is desired to ring. It is recommended that five dry cells be used, which will efficiently ring fourteen 1000 ohm ringers, or sixteen 2500 ohm ringers, on a line of 500 ohms resistance, an equivalent of about a thirty-mile metallic circuit of No. 12 B. & S. copper wire.

Fig. 2. Open View Showing Mechanism.

The interrupter is so adjusted that it responds at once when the key is pressed, closing the battery circuit. This insures a very economical current consumption, as the interrupter is only in action when the battery circuit is closed.

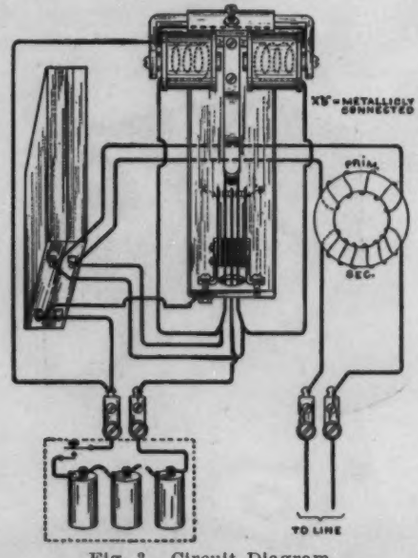


Fig. 3. Circuit Diagram.

The mechanism is practically noiseless and sparkless. All circuit contacts are of platinum. While the mechanism is sensitive, it is built in a substantial manner which insures long service and low maintenance. The circuit diagram shown in Fig. 3 shows the simplicity of the circuit and the ease with which it can be connected.

TRADE NOTE.

The Westinghouse Electric & Manufacturing Company, of Pittsburg, Pa., has recently booked several large orders for small power motors. These include 1000 graphophone motors for the American Graphophone Company; 500 ¼ h.p. special a. c. motors for the Electric Renovator Manufacturing Company; 500 1-8 h.p., 110-volt, 60-cycle DA motors for the 1900 Washer Company, 450 1-15 h.p. DA motors for the Wayne Manufacturing Company, and 624 ½ h.p. a. c. motors for the Hobart Electric Company of Troy, Ohio.

NEWS NOTES

FINANCIAL.

KINGSBURG, CAL.—The Board of Trustees passed an ordinance providing for the issuing of bonds of the city of Kingsburg in the amount of $26,000 for the proposition of paying the cost of a certain municipal improvement to wit: For the proposition of paying the cost of the acquisition, construction and completion of a municipal water plant for supplying the city of Kingsburg with water for domestic and other use and for protection against fires, including water bearing lands, works, pumps, reservoirs, pipes, mains, laterals, fire hydrants, cut-offs, taps and service pipes.

MONTEREY, CAL.—The controlling interest in the Monterey County Gas & Electric Company has been bought by interests represented by F. G. Baum of San Francisco, who is to have entire management of the electric and gas plants at Monterey, the electric railway between Del Monte and Monterey and the electric light, gas and water plants at Salinas. The steam plant at Salinas is to be taken out of commission and a tie line built from the steam turbine plant at Monterey, an assessment of $3.00 per share having been levied to carry on the work. Extensive improvements are also to be made in the Salinas water system. The purchase price is believed to be about $900,000.

INCORPORATIONS.

CONNELL, WASH.—The Enterprise Telephone Company has been organized by W. H. Welch to build a line south of the city.

SEATTLE, WASH.—The Bellevue Electric Company, capital $500,000, has been incorporated by E. P. Morgan, H. L. Collier and Frank J. Maron, to construct an electric line from Bellevue to Lake Sammamish.

TACOMA, WASH.—Articles of incorporation have been filed with the county auditor by the Mt. Tacoma Telephone & Telegraph Company, capital stock $3000. The trustees are A. E. Dye, Isabella Dye and Charles C. Biggs.

ONTARIO, CAL.—The West Ontario Mutual Water Company has been incorporated with a capital stock of $10,000. The directors are: N. H. Garrison, J. W. Fulton, R. B. Campbell and others. The purpose of the new company is to purchase, develop, sell and distribute domestic and irrigating water.

SPOKANE, WASH.—The Washington Consolidated Telegraph & Telephone Company, capital $1,000,000, has been incorporated by Fred Howes of Burlington, Vt.; H. H. Reynolds of Peterboro, N. H., and C. M. Cooley of Spokane. It is proposed to acquire holdings of a number of smaller telephone companies in this vicinity.

LOS ANGELES, CAL.—H. E. Huntington has created a new corporation, The City Railway Company of Los Angeles. The mission of the new corporation is to build extensions and new lines for the Los Angeles Railway Corporation and the Huntington Company, controlling all of the city street car lines. The directors of the new company are Howard E. Huntington, G. C. Ward, C. A. Henderson, J. E. Brown, W. E. Dunn, S. M. Haskins, Albert Crutcher.

PAYETTE, IDAHO.—Articles of incorporation have been filed here for the Salmon Falls Light & Power Company. The principal line of business of the company is furnishing light and power for flour mills and saw and planing mills. The capital stock is $100,000, divided into 1000 shares of the par value of $100 each. Mr. Wright states that they have a power site whereby they can develop from 2300 to 3000 horsepower and that they can obtain a working head of one hundred and twenty-three feet when fully developed.

SAN FRANCISCO, CAL.—Articles of incorporation of the Western States Gas & Electric Company, have been filed, in which the capitalization of the corporation is fixed at $15,000,000, divided into $10,000,000 preferred and $5,000,000 common stock. The organizer of this corporation which proposes to operate in California on a large scale, is the firm of H. M. Byllesby & Co. of Chicago. The purpose of the corporation, as stated by the Byllesby representative here, Fred W. Stearns, is to take over the gas and electric companies which this firm has already purchased in California and such other properties as they expect to acquire in the future. The principal holdings of this firm in California at present are the Stockton Gas & Electric Company, which was recently purchased, and the Richmond Electric Company. Negotiations are pending for the acquisition of the Eureka Gas & Electric Company. The Byllesbys also own the San Diego gas works. In the Northwest they have several properties, including the gas company at Tacoma.

TRANSPORTATION.

VICTORIA, B. C.—The B. C. Electric Company has located the line of its proposed road to the Saanich peninsula.

SAN RAFAEL, CAL.—George D. Shearer has been granted a franchise to operate an electric street car system in this city.

SAN FRANCISCO, CAL.—The Board of Works awarded a contract to the Pennsylvania Steel Company to furnish a consignment of rails for the Geary Street Railroad, the price being $88,943.

ALBANY, ORE.—The City Council of Lebanon has granted the Albany and Interurban Railway Company a franchise through that city. This line will run from Albany to Sweet Home via Lebanon, thence across to Holley, down to Brownsville and back to Albany.

VANCOUVER, B. C.—The survey has been completed for the construction of the proposed electric railway system from Bakerville to Fort George, distance 150 miles. Mr. Murphy of Vancouver is in charge and construction work will start in the spring. A water-power plant will be constructed to supply electricity.

TUCSON, ARIZ.—To make arrangements for the construction of the street car line extension from the present Third street terminus to a point on Speedway about two miles from the city, E. R. Sanderson, a representative of the controlling company, of which the Tucson Rapid Transit Company is a subsidiary, is on his way to Tucson from the East.

OAKLAND, CAL.—Rejecting the application of the Oakland Traction Company for a franchise on several streets of the city, the Council has voted not to consider the matter until the railroad company had segregated its requests. The application was for a franchise on portions of Hopkins street, Peralta avenue, San Pablo avenue, Market street, Fifty-fifth street, Clay street, Eighth street, Thirteenth street and Washington street. Councilman Albert H. Elliott challenged the form of the application, which he said would call for a blanket ordinance. Admitting that a franchise on Hopkins street

might be desirable he stated that there might be some objection to converting Clay street into a railway thoroughfare. Any further application by the traction company for its franchises will now come under the provision of the new charter. The granting of a 50-year franchise would be thus blocked until July 1, when the charter goes into effect.

PORTLAND, ORE.—The Portland Railway, Light & Power Company is preparing to improve its car service on the east side by providing greater power. Plans for the construction of a sub-station at East Sixtieth and Stark streets have been filed. The new power plant will be housed in a one-story brick building. The company will expend about $40,000 for rotary generators and other electricity making machinery to be installed in the new station.

SACRAMENTO, CAL.—The Northern Electric Company, operating from Sacramento to Marysville and Chico, is closing a deal for the purchase of the George Bryte ranch in Yolo county across the Sacramento river from Sacramento, for a terminal to be known as West Sacramento. The terminal of the road will be on the other side of the river and shops, switching yards, etc., will be laid out there. Wharves, docks and warehouses will be built along the river front, which the company owns.

SACRAMENTO, CAL.—In accordance with its franchise the Northern Electric Company will, it is announced, begin its local service on Eighteenth and D streets and Eighth and J streets. The tracks of the company, going out I street have been laid, and according to the provision of the franchise, the company must start a 20-minute service on the line. Melville Dozier, assistant general manager of the company, says that a style of car the same as used on the Los Angeles street car system will be used by the Northern Electric Company.

TRANSMISSION.

HANFORD, WASH.—The transmission line from the local plant of the Pacific Light & Power Company will probably be extended south to Richland and possibly to Kennewick.

CHEHALIS, WASH.—It is reported that blue prints and plans are in progress for the construction of a new power plant in the Big Bottom country for the Valley Development Company, work to start February 1.

TACOMA, WASH.—Pierce County Commissioners have granted Seattle-Tacoma Power Company a franchise to string a high-power transmission line five miles long from the south boundary of Puyallup Indian Reservation to North Puyallup.

AMERICAN FALLS, IDAHO.—Final arrangements have been made for increasing the capacity of the American Falls plant of the Idaho Consolidated Power Company from 3000 to 30,000, work to commence in the near future. Gov. James H. Brady is president of the company.

GREENVILLE, CAL.—The Indian Valley Light & Power Company is about to make extensions in their transmission system. Taylorsville, Crescent and Seneca will be benefitted by these improvements. The company is having plans made for a larger power plant. O. C. Pratt, Crocker Building, San Francisco, is general manager.

WINNEMUCCA, NEV.—George Wingfield has completed the purchase of three ranches on the South Fork of the Humboldt river, with all water rights connected with them, and intends to begin the construction of a big power plant for the operation of a reduction plant for the Buckhorn mines. He will first build a dam 100 feet high, which will cost $150,000 and which will back the water up into a big reservoir. This will provide all the water necessary for generating electric power.

WHITE BLUFFS, WASH.—Construction work on the power line from the Hanford plant to Richland and Kennewick will be started this winter to furnish power for irrigation along the Columbia River from this place to Priest Rapids.

SONORA, CAL.—The National Park Electric Power Company has filed a complaint in the Superior Court of Tuolumne County against the city and county of San Francisco to restrain it from diverting 10,000 miner's inches of water immediately above the plaintiff's point of diversion near the Yosemite National Park boundary. The company claims a flow of 25,000 inches in Tuolumne river and if San Francisco is allowed to divert her claim of 10,000 inches, the plaintiffs will be wholly deprived of their rights.

ILLUMINATION.

CLARKSTON, WASH.—Wm. H. Gairani, representing the Pacific Light & Power Company, has applied for a gas franchise in this city. If the franchise be granted, the company plans to begin construction within six months.

TWIN FALLS, IDAHO.—The Council has passed an ordinance granting to Earl E. Miller, the right to construct and operate works for the manufacture of gas, and the laying down of gas mains, pipes, and conduits in and along several streets, alleys, avenues and public places for the distribution of gas in Twin Falls.

HERMISTON, ORE.—An ordinance has been passed granting to B. A. Chisholm and G. A. Chisholm, a franchise for erecting and maintaining and operating an electric lighting and power system, and erecting and maintaining poles and wires in, along and upon and over the alleys, streets and public grounds of the city of Hermiston.

WATERWORKS.

YUCAIPA CITY, CAL.—General Manager Atwood of The Land & Water Co., is having plans made for the extension of the water system.

MEDFORD, ORE.—The City Council has awarded to James A. Mear of Portland the contract for the construction of the new water system.

PORTOLA, CAL.—The Portola Water Company has applied to the Board of Supervisors for a franchise to lay pipes and water mains in the streets and alleys of the town of Portola.

OAKLAND, CAL.—This company has let a contract to Crane & Company for 30 miles of pipe, which will mark the beginning of the system in the East Oakland division. The shipping of this material is to commence within three days and the work of installing the pipe will begin as soon as it arrives. It will vary in size from 4 to 12 inches.

SAN LUIS OBISPO, CAL.—The action by the Board of Trustees at their meeting last week in accepting the proposition, made to them by Frank Tate, who owns lands and rights needed by the city of San Luis Obispo for a greater water system, shows a fine prospect. It will permit the trustees to proceed at once with the work of building a new reservoir.

PROSSER, WASH.—Secretary Ballinger has awarded the contracts for the work on the Prosser division of the Sunnyside unit of the Yakima irrigation project as follows: Orrin H. Stratton of Spokane, four bridge spans, $12,000; Bernard Bros., of Prosser, trench and canal excavations, $18,830; Pacific Tank & Pipe Company of Portland, wood stave pipe, $18,972. The diversion dam and steel flumes will be built under force account.